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# Computer Weekly

Thursday, December 15/22, 1983

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## Group sets up to fight the pirates

by George Black  
A FEDERATION against software theft is to be set up to campaign for amending copyright law to cover software and to press for stiffer penalties against piracy.

The federation will have the support of a number of leading manufacturers, including IBM, ICL and DEC, as well as several trade bodies, such as the British Computer Society, National Computing Centre and Computer Trade Association.

They voted unanimously at a copyright committee meeting of the BCS last week to band together in a move to set the law straight and bring penalties in line with those now imposed on video pirates. Leading figures in the new federation will meet members of Picom, the parliamentary information technology committee, in the New Year for talks on the chances of getting a Private Member's Bill introduced.

Behind last week's development lies the idea of bringing in a simple, single-clause Bill amending the 1956 Copyright Act, to make the term "literary work" include computer programs and the term "writing" include input and output.

Two and a half years ago a government Green Paper recommended major changes in legislation, but these have been postponed pending a broad review of the whole field. The BCS committee argues that programs are in fact already covered by the existing law, but that the public either does not understand this or is not deterred from theft by light penalties.

A Private Member's Bill, supported by the government, was carried successfully in July amending the penalties for video piracy. Conviction for criminal offences, involving video piracy, under the Copyright Act can now lead to fines up to £2,000 and imprisonment for two years. But all other sorts of breach of the Act, including software piracy, still have a £50 fine limit.

An official of the Department of Trade and Industry said that the low limit on fines for software offences meant that few writers of programs had thought it worthwhile to bring cases to court. More often they had simply moved into a new field of development in search of greater rewards.

"The government obviously realises there is a problem in that the Act is not specific about software. There are various proposals under consideration, but it is very complicated," he said.

Chairman of the Computing Services Association's legal group, Ronald Robertson, said the aim of the newly-formed action group would be to persuade MPs of the need for changing the law.

"We have to give them examples of how companies, sometimes in their own constituencies, are suffering from theft of programs," he said. "We must educate the marketplace at large. It is crucial to overcome the attitude that seems to be developing that there is nothing wrong with copying someone else's software."



ROBERTS... "The transporter will be an interesting addition."

## Cash-rich GEC talks to Inmos

by Dave Madden  
UK electronics giant GEC this week revealed that it holds £1.5 billion in cash, shortly after confirming that it is talking to Inmos with a view to buying the state-owned micro-maker.

Both companies admit that talks have started, but GEC is not the only corporation interested in taking a stake in Inmos, and no decision as to Inmos' fate is imminent.

GEC's renewed interest in Inmos represents an about-turn. The company waived a chance to take Inmos on in 1980. Now Derek Roberts, GEC's director of research has said that enough had changed since then - both within Inmos and its marketplace - to make another look worthwhile.

Roberts' view is that despite its parlous financial state, Inmos has made a lot of progress, while the transporter, "if they can deliver it, and it performs as they predict, will be a very interesting addition," he said.

GEC is not the only suitor, and according to one commentator, it is not the favourite either. Inmos reported to be speaking to several other companies, including Philips, SGS of Italy, and AT&T Western Electric in the US.

One possibility is that a multinational corporation might take a minority stake in the company, along the lines of the IBM/Intec deal - which would give Inmos capital to work with, and at the same time, put a price on the company.

It could still go ahead with plans for flotation either in the UK, or both the UK and the US, in the medium term.

Such a strategy would presumably exclude GEC which has no history of making equity investment in small companies, as opposed to acquiring research units.

Speculation about a link with Inmos has enlivened GEC's otherwise uninspiring interim figures.

Pre-tax profits for the six months to September 30, were down from £291 million this time last year to £285 million, on turnover of slightly at £2.612 billion.

## Two face trial after PDP seizure

by George Black  
TWO men could be committed for trial in January for allegedly trying to export DEC PDP-11 minicomputers to Czechoslovakia.

They are the directors of a small company at Ferndown, near Wimborne in Dorset, called Datalac. Bryan Williamson of Ringwood, Hampshire, and Christopher Carman of Bransgore, near Bourne-mouth, were remanded by Poole magistrates on Monday on bail of a £6,000 surety each. Their passports have been confiscated.

John Cassey, of the Customs and Excise special investigating division, told magistrates that the offence was said to have occurred on or about December 11, when six PDP-11/34s and PDP-11/44s, valued at around £500,000, had been intercepted at Poole docks. He said they were bound for Cherbourg and thence to Czechoslovakia.

The PDP-11 was first made in 1970, but DEC says it cannot get export licences to distribute it in Czechoslovakia.

Last week US commerce secretary Malcolm Baldrige criticised the scope of the list of restricted technology drawn up by NATO's co-ordinating committee, Co-com, as being out of date.

Checks on the flow of computer have been stepped up in recent months in the wake of the US government's Operation Exodus initiative, to stop the Soviet Bloc getting American-made technology for military use. Earlier this year a consignment was halted at Dover docks, believed to have contained a Vax but labelled as "type-setting equipment". Other consignments have been seized in West Germany and Sweden.

## ... while DEC keeps in bond

by John Riley  
DIGITAL EQUIPMENT is using software to keep its kit in bond in Scotland, and save £500,000 a year. The new system allows it to take advantage of three different Customs import relief schemes at once.

The system, written by UK software and systems house Computer Management Group, means that DEC can now avoid tying up cash by paying duty when components are imported for assembly in the UK, and then claiming a refund when it re-exports them in finished products.

The original specification was produced by DEC, and CMG wrote the software in a deal worth around £200,000. The software, which is written in Cobol for DEC's VMS operating system, took a year to produce. The system keeps track of imported components at all times, conforms to Customs' formats and can communicate via magnetic tapes with the Customs' main computer at South-end.

The system, to be implemented by DEC at its plant in Ayr, combines three systems: period entry imports system; franchise warehouse system; and import duty relief system.



HEALY... "We will be setting up in the New Year."

## Osborne is reborn in US

by Nuala Moran  
THE Osborne Computer Corporation in the US is to be reborn next month.

And Osborne in the UK is proceeding with its plans to go independent. Mike Healy, UK managing director, said: "We will be setting up in the New Year with Osborne in the US taking a minority holding."

"The creditors committee, banks and courts have given their approval to a plan for restructuring and relaunching the US company, which filed for bankruptcy in September."

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## AT&T takes 20% stake in Olivetti group

by Dave Madden  
AMERICAN Telephone & Telegraph is set to take a 25% stake in the Olivetti group for around \$260 million. The companies have signed a nine year agreement, and AT&T has an option to increase its interest to 40% after four years.

Apart from a substantial cash injection the venture brings AT&T technology to Olivetti, whilst AT&T gets access to Olivetti's European marketing organisation.

Olivetti will market and may eventually manufacture AT&T equipment in Europe. An AT&T spokesman said that this would include AT&T's Dimension range of private switches, telephone and teletype equipment, microcomputers, terminals and software such as the Unix operating system.

Olivetti has long been looking for an effective marketing organisation in the US, and the promise of using AT&T's distribution channels must have been the biggest attraction for Olivetti of the deal.

AT&T has agreed to take \$250 million worth of Olivetti kit in the first year of the venture. But AT&T insisted that any specific marketing arrangements in the US had still to be negotiated - and no decision is likely before mid-1984.

Olivetti's president, Carlo de Benedetti, announcing the link in Rome, said: "Olivetti is now an established European leader in this field - but there is an increasing need for global co-operation in the Information Technology industry. Only a few companies will survive, and Olivetti will be one of them."

James Olsen, chairman of AT&T Technologies, said that the deal was a major advance, combining "the unique strengths and skills of two industry leaders". He expected the new venture to have a "pivotal role" in world office automation and described Olivetti as "the ideal partner".

AT&T insisted that the deal would not affect its joint venture with Philips, as that covered public switching and transmission, whilst the Olivetti venture was only concerned with end user products and technology.

But the move may compromise Olivetti's relationship with Northern Telecom - at the moment it sells the Canadian company's SL1 PABX, which competes directly with AT&T equipment.

Industry gossip has linked AT&T and Olivetti for several months, and the speculation has driven up Olivetti shares in Milan by about 15%. Rumours were encouraged by the news in November that the French government's CIT/Alcatel had reduced its stake in Olivetti from 32.4% to 10%.

The remaining 22.4% held previously by Saint Gobain and Cie des Machines Bull, returned to Olivetti, and purchased by companies linked with Benedetti.



DE BENEDETTI... Co-operation.



TEBBIT... Is there a note of desperation in his plan?

## Unions scorn Tebbit's plan

by George Black  
GOVERNMENT moves to boost software development in the regions have been welcomed cautiously by the industry's leading spokesmen - and scorned by the unions.

A White Paper introduced to the Commons by Secretary of State Norman Tebbit shortly before Christmas is aimed at shifting aid from the manufacturing sector towards services. Tebbit specifically invited reform, such as the award of grants for rented hardware to the manufacturer instead of the user.

Doug Byeions, director general of the Computing Services Association, approving the news, said it made good sense to back the field in which jobs were growing, rather than manufacturing where they were disappearing.

National Computing Centre director David Fairbairn also supported the change, but said it had a note of desperation.

"They feel they've got to try something," he said.

The CBI favours extending aid to services and will respond to the paper in detail in the spring.

But Tim Webb, national officer of the Association of Scientific, Technical and Managerial Staffs, said the policy switch would only accelerate the trend to higher employment in the south-east by butting assistance to traditional manufacturing areas.

Although the paper was prepared before Tebbit took office, his imprint is clear on it.

Information Technology Minister Kenneth Baker, noticeably more resilient since the resignation of Cecil Parkinson, told a parliamentary IT committee meeting that his projects had escaped the latest swing of the axe. This is taken to mean no reduction of his £200-£300 million budget.

## Engineering is set to boom in 1984

by John Riley  
THIS year will be a booming year in demand for computer equipment from the engineering industry, especially from smaller companies in that sector.

That is one finding of a survey published today which highlights the areas in the industry that are ripe for computerisation.

The survey reveals that overall almost three quarters of the estimated 134,000 British engineering establishments have no access to computers at all, and that only 14% have their own computer.

Another finding is that there will be 4,900 new users among companies with up to 50 employees, and 700 among larger companies employing more than 500.

See pages 22-23 for full details

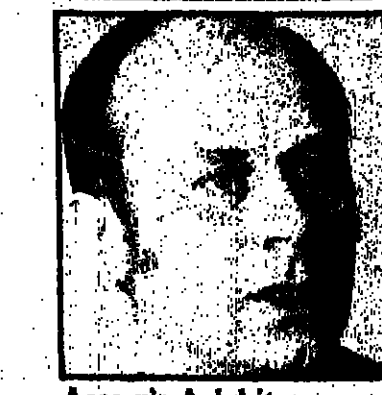
50. Of these, 200 small companies and 450 large ones will acquire multi-user systems.

The survey, which was carried out by International Data Corporation (IDC) for Computer Weekly, comprised a stratified telephone sample of nearly 3,200 engineering establishments. The results were weighted both according to the establishment's size and its sector in the engineering industry.

The total number of engineering establishments with computers could rise from the present 14% to as much as 23% of the 134,000 companies by mid-1984, says the survey. That would mean up to a 60% increase in computer penetration.

When it comes to computer applications, the survey finds that there are several underexploited areas, even in large companies employing more than 500 people. Under-computerised applications include personnel record systems, budgeting and forecasting, and graphics and design applications.

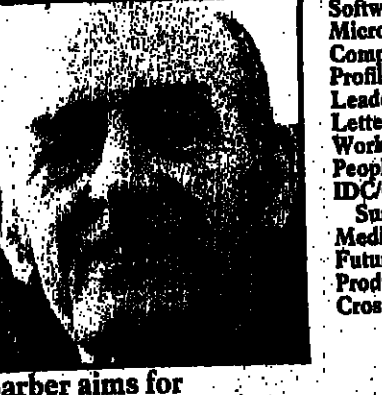
The report suggests that there is considerable scope for engineering companies to computerise graphics and design applications. Of the 17% which actually use graphics or design, only 3% have computerised those applications. The scope is greatest in the mechanical engineering sector, where 35% of



Arrow's Ash hits at government



Engineers are slow to computers



Barber aims for Alvey net

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## Information hits dizzy heights

by George Black  
INFORMATION could be recognised as an industry in its own right, if the government gives the positive lead expected in the spring.

The Department of Trade and Industry is weighing up an official report by the Cabinet Office Information Technology Advisory Panel, published in September, which urged the government to treat information as a commodity, taking a much broader approach than in the past.

Colin Southgate, chief executive of Thorn EMI's information technology division and one of the seven-man panel, said the report had met a slower response in official circles than the previous one on cables, but he added that it was "gathering momentum".

Southgate warned: "Unless they take this on board, it's a market sector in which we will lose out again."

Information was a far wider subject than just information technology, he said. Government should recognise this by creating a single focal point for dealing with the interests of the industry, which, with one million employees, was now as big as construction.

He argued that the government should set an example by making its own data easily accessible in machine-readable form, as the Americans had done. And it should prove it took seriously the value of information by reforming the copyright law.

He said there was a need for more co-operative planning between the government and private sector to ensure that Britain received a fair share of the world market. And he argued that there was a case for having a minister responsible for information, instead of just information technology.

The panel, whose cable report gained an outstandingly quick reaction from the Cabinet, took over six months preparing the second document, entitled Making a Business of Information.

Southgate emphasised that he thought the impetus had to come from the private sector, after the government had responded to the report with a new framework for industry. He agreed with a recent statement by the European Information Providers' Association (Euripa) that government should intervene as little as possible in the market.

He said that publishers, broadcasters and film-makers had been too slow to realise how their interests were converging and to grasp newly-emerging business opportunities.

"It's no good our rushing around producing a lot of high technology equipment unless we think about how it is going to be used and the value of the information which is being communicated," he said.

"Information firms could start by putting their own houses in order and providing up-to-date statistics on the state of their own industry."

## SALES BRIEF BT to supply Blue Circle digital net

BRITISH TELECOM has been chosen as a major supplier by Blue Circle Industries for its new million digital speech and data communications network. It MegaStream service, which transmits at two million bits a second between private exchanges is the base of the network.

"When our new integrated communications network is complete we shall save at least half a million pounds each year on telecommunications costs," said Blue Circle telecomm manager Roland Le.

## Varsity choice

NORSK DATA, Norway's largest indigenous computer maker has been given an £80,000 contract to supply an ND-520 minicomputer to the Department of Physical Chemistry at Oxford University. "The clinching factor was the array processing microcode facility, which increases the processing speed by a factor four to six times," said Ian Coles, senior research officer.

## Scots go online

THE Scottish Office has chosen an online general ledger system from Management Science America as the base of a new management and budgeting system to comply with the government's White Paper urging public sector bodies to become more efficient. MSA's Easy Screen system will be installed in the Scottish Office in Edinburgh at an estimated cost of £100,000.

## Orders for £1m

BURROUGHS Machines has taken orders worth over £1 million in the last year for non-banking document processors, following the establishment of new marketing teams. Recent orders include Thames Water, with a £140,000 order for a S3900 optical character reader system for processing remittances, and an order from the National TV Licence Records Office.

## Ace order

PACKAGE Programs of London has won a US order for its Ace Asset Control and Evaluation System. The order comes from Statistical Tabulation, one of the largest computer bureaux in the mid-West.

## Bank link

SCICON, one of the largest UK computer services groups, has installed a communication link for the Banca d'Italia in Rome in a £30,000 contract. The order involved two of Scicon's Comboard/Hasp 1231 communications links, which connect a DEC Vax 11/750 with the bank's central IMB mainframe computers.

## Powerful system

FERRANTI Computer System is supplying a multiprocessor computer system worth over £800,000 to the Central Electricity Generating Board's North-east Grid Control Centre at Leeds. The system, including 15 Argus 700 computers, will monitor and control the CEBG's high voltage transmission network.

## Water network

HARRIS Systems has won a £350,000 order from Wessex Water Authority in Bristol for a PABX digital telephone exchange. Installation begins on the 400-line network this month.

## Baltic contract

THE Baltic Exchange, the international shipping and commodity exchange in the City, has signed a contract with Lodon Specialist Software System (LSS) to supply application software for its

## Arrow boss urges faster cash flow

by John Riley

BUSINESS computers should be sold cash on delivery, and tighter credit controls are needed to speed up the cash flow within small computer companies. That is the view of systems house Arrow Computer Systems' managing director, Brian Ash.

Ash, who has built Arrow from scratch into a £3.5 million company employing 25 people over the past six years, last week hit out at government's ignorance of small businesses' needs and called a halt to the cash blockages suffered by small companies.

"Too many small companies are living from hand to mouth and they can't pay suppliers until they are paid by their customers," explained Ash. "Therefore, by getting customers to pay cash on delivery, as they do in the home computer market, the cash turnover is speeded up."

Another related problem for the small businessman is to check on the creditworthiness of his clients. Ash said that the government was not doing enough to control credit. "On some parts of the Continent it is illegal to write cheques if you haven't got the money in the bank to cover them - but here government controls are lax."

He pointed out the larger companies are affected by the poor financial health of smaller ones, as they are often important customers. "This year a lot of com-

puter companies have been in financial trouble," he said, "and whenever a large company goes down, several new ones are started up by their former employees. These are often totally underfunded and a good proportion of them fail - so there are a lot of bad debts floating around."

Ash said that standard methods of credit control were geared to larger companies. "If you go to a trade reference company, you need to go to a big one. But apart from being expensive, they are slow and not geared up for small business. In our industry we want to make a sale now - not in three weeks' time."

He added that debt insurance schemes, as opposed to factoring schemes to guard against bad debts, were hard to find. He had been required to insure the whole of his customer base. "As 50% of that is government and universities, and they do pay up, it works out to be very expensive."

He added that, although banks could be helpful for references, they did not provide a fully effective safeguard. Although 1983 was the Year of the Small Business, it had made no impact on Ash. "When the government talks of small businesses, it thinks in terms of companies employing 100 or more people, whereas in our industry potentially fast growing small businesses often have six to 10 people."

## BT tenders high volume optical fibre contracts

by Nuala Moran

UK manufacturers of optical fibres are being offered the chance by British Telecom to get into competitive volume production. BT has invited firms to tender for 14,000 miles of cabling for local junction networks, with the promise that if the price is right it will buy optical fibre in preference to audio cable.

The planned expansion involves eight schemes in five regions. There will be two each in South Wales, Devon and Birmingham, and one in Glasgow and in Manchester.

These schemes do not involve any replacement of existing audio cables. A BT spokesman said they were planned to cope with the increased use of the network, presently running at a rate of 5% per annum, but expected to increase more rapidly with the growth of information technology.

The problem for the manufacturers is that existing audio cables are already very efficient and cost effective to produce.

What BT is effectively saying is that, with its sale to the private sector on the horizon, it is no longer in a position to subsidise manufacturers to get into large volumes, and so enjoy the resulting economies of scale which allow them to break into world markets.

To be competitive in the high volume optical cable business, output from one manufacturer needs to reach 100,000 km/year, according to Sir Kenneth Corfield, chairman of STC, speaking at the World Telecomms conference in December. He said that this level of production would bring down the cost of optical fibre to the prevailing market cost of 18 pence per metre.

Sir Kenneth said that at the moment none of the three manufacturers in the UK - STC, BICC and GEC - could produce at this volume, with the result that none of them was competitive on the world market.

A further challenge to reduce prices coming from the BT request for tenders will be to the manufacturers of opto-electrical converters, which change signals from light to sound at the end of optical fibre cables.

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## Esprit budget gets approval

by John Riley

THE European R & D programme, Esprit, is now underway following the approval of the 1984 budget by the European Parliament before Christmas.

The five-year, £840 million IT research programme now has £27 million towards this year's payments and £124 million towards future commitments for projects initiated this year.

In the week before Christmas, there was an informal call for proposals from consortia of

European IT companies.

"The only danger was the rejection of the budget," said a well-placed spokesman, "because then we would have had to have worked on the basis of monthly payments and wouldn't have been able to guarantee anything."

He added that the budget approval left research ministers in the UK and Germany "with no foot to stand on". Both recently refused to sanction funds for the Esprit programme.

Another major programme, for

telecommunications, is still in its formative planning stage, and a high level group has been set up to hammer out priority actions.

The IT task force of the European Community, which will run both programmes from Brussels, is also planning programmes in three other areas: non-Esprit related IT research; communications strategy; and standards.

A policy document on the programmes is expected to be issued on standards by the middle of the year.

## Local network specialist sets up own R&D centre

by Nuala Moran

LOCAL network specialist Digital Microsystems (DMS) has set up a research and development centre at its former headquarters in Twyford, Berkshire. Six months ago the rest of the company moved into new headquarters in Wokingham.

There are 20 staff at the R&D centre working on enhancements to HiNet, DMS's local area network. This will include the ability to link HiNet to a range of mainframes and linking HiNets; over different sites; including, communication to K&S and Jager. Other work includes development of a

wider range of HiNet terminals and improving disc storage.

The DMS UK subsidiary is wholly owned by electronic news company Bxtel, the major shareholder in DMS in the US. It was set up in September 1982 with 12 staff. There are now over 100 employees.

A German subsidiary is being set up at the moment. This will initially be a sales and marketing office, but DMS marketing manager Patrick Johnstone said if things went well it would be developed into a UK operation. HiNet is installed at over 1,000 sites in the UK.

## Candle casts light on IBM units

by George Black

CANDLE, the Los Angeles company that helped to create a market for IBM mainframes, real time, performance-monitoring software, is now diversifying into continuous performance monitoring.

Users have been demanding means of checking not only what their machines are up to at any one moment, but also what they have been doing over a period, says Candle's technical services vice-president, Marty Sprinzen.

The move into continuous monitoring began in October, when Candle introduced its Liplog suite running under the MVS operating system. Next year there will be IMS and CICS versions.

Sprinzen says users have been complaining that existing tools in this field are hard to use, don't collect enough data and don't allow analysis of problems such as delays in response.

IBM has similar products, such as RAFE under MVS, but, according to Candle, it has been far more co-operative towards writers of add-on systems over the past year. "They've told us point blank that they aren't out to hurt us," said Sprinzen.

However, Boodle and Babbage, a parent of the European Software Company, may be less welcoming towards Candle's intended expansion, both because the two firms are still locked in a patents wrangle

on their home ground of California, and because Boodle is selling directly competitive products in this area.

Boole last year strengthened its set of tools with IMF running under IMS.

Candle's Epilog/MVS has had some early success at least in trial sites, gaining some 100 users in Europe and North America since October. Legal and General Assurance has been experimenting with it here.

Candle's ranking in the software hierarchy is hard to define, as it is still privately-owned, but it is on the bottom edge of the top 20 and turned over about \$25 million in 1982.

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# Rank tries artificial intelligence

by Dave Madden

RANK Xerox is making a determined bid to get into the UK artificial intelligence market through the back door.

It has formed a joint venture called Artificial Intelligence Ltd with four ex-employees. The new company will sell the Xerox 1180 scientific workstation which runs Xerox's own version of Lisp-Interp II, which is the fourth generation programming language which leads itself to building expert systems.

Artificial Intelligence is headed by David Butler, a former director of Rank Xerox's special business division. Butler owns 51% of the company, Rank Xerox 25%, and three other directors the balance.

Xerox conceded that it has set up Artificial Intelligence as a dedicated unit because it is unwilling to commit sufficient resources to succeed in such a specialised market outside its mainstream business.

To begin with, Artificial Intelligence will merely market Xerox products in the UK. Eventually it hopes to create its own expert systems.

The 1180 is based on Xerox's Star 8101 workstation. It is de-

veloped at its Palo Alto Research centre specifically to run Interp-II. In the UK the machine will sell at a bottom price of around £14,000 - that buys a one Mbyte CPU, high resolution portrait screen, and a 10 Mbyte Winchester hard disc. The Interp-II software costs another £9,000.

Xerox has released a new object-oriented programming system - Lovers - which is a shell for Interp-II, designed for artificial intelligence programming novices. This will be available for £150.

Artificial Intelligence has £50,000 to play with at the moment - and Butler is confident that the company will break even in year one. He expects to sell 15 systems during 1984, split evenly between industrial and higher education customers.

So far, the company has four firm orders, and two letters of intent, including one from the Ministry of Defence. It has delivered systems to STC's Standard Telephone Laboratories, and the South Bank Polytechnic's knowledge-based system unit - which is developing a heating and ventilation design system.

Artificial Intelligence is already talking to Edinburgh University, and Birkbeck College, London, about collaborating in research applications for the system.

Butler also hopes to get something out of Alvey.

Dr Henry Thompson, lecturer in artificial intelligence at Edinburgh, and a consultant to artificial intelligence Ltd, commented:



BUTLER... Company will break even in first year.

"The problem is that so few people in the UK are qualified to do artificial intelligence work, but the ones who are need the best material support. This system is affordable - so we no longer have any excuse."

The system has been available in the US since last September - and Xerox has sold between 40 and 50 so far.

## Programmers' job swopping increases

by Philip Hunter

JOB-SWAPPING among programmers is on the increase after falling for several years, giving further evidence of a recovery in the data processing industry, according to a survey by Computer Economics.

Almost 15% of programmers in work at the end of 1982 have since resigned. The survey, based on 35,000 computer staff at 813 installations, reports a similar rise in the rate of resignations among other job categories, and among systems programmers. The figure rose from 9.9% in 1982 to 11.7% this year.

Further evidence of a recovery is an increase in the number of hours overtime being worked by programmers and operators.

However, programmers' salaries, up by less than 8%, have lagged slightly behind the national earnings index, although Computer Economics director Peter Stevens expects there to be an increase in salaries in the next year.

as employers find it harder to attract good programmers.

Operators have done well in last year with salaries up over 10% according to the survey. Stevens thinks this is partly due to operators naturally catching up with other sectors and partly to the result of increased overtime and necessary but previous staff cuts.

There is also evidence of a rise in the number of computer staff with the number of data processing managers leaving company cars up from 794 in May 1982 to 836 in November 1983.

Similar increases in the incidence of company cars have taken place among operations managers, computer services managers and system managers.

"If a DP manager is given a car, he's never going to leave you for a job that doesn't give one," says Stevens. So firms are under pressure to offer cars to their managers.

November 1983 Survey, Computer Economics, 51 Portland Road, Kingston-upon-Thames, Surrey KT1 2NL

## Five finds new owner

by Dave Madden

TECHNOLOGY For Business, the management buy-out from Logabank now quoted on the Unlisted Securities Market, has bought Five Technology, a micro-system distributor.

Paul Bion, chairman of Technology For Business, said that no cash had changed hands - the deal was a straight share swap. Five Technology will contribute less than 5% of the enlarged equity of Technology For Business, but it could produce 30% of the company's turnover.

Five Technology, set up in 1982, is the exclusive UK distributor of multi-user systems from US company Micro Five Corp. It will continue to trade under its own name.

Bion said: "Five Technology will be run as a separate operation within the group. It had reached a level of business which a cash takeover would have been a waste of money - it will now trade from a wider financial base."

The basic attraction for Technology For Business was the acquisition of Five Technology's network of 25 dealers. Although Technology For Business is best known for its "Partner" and "Senior Partner" systems for solicitors' practices, 45% of its turnover comes from distributing peripherals.

It will now push this business through Five Technology's dealer as well as its own direct sales force. And Five Technology is likely to diversify into distributing business software for ACT Sirius and IBM Personal Computers.

SPARKS flew between BHC micro maker Acorn and Personal Computer World magazine which went ahead with publication of a controversial article after paying £65,000 damages.

Acorn had a High Court injunction to prevent sale of the magazine's January edition, which it said incited readers to copy its programs.

An Acorn spokesman said the £65,000 would be put towards developing new security systems for its software which had been endangered by the article.

He added that Acorn was not contemplating further action, though it felt that many non-technical readers could have learnt from the article how to produce perfect copies of Acorn's programs.

But editor Jane Bird said the manufacturer's claims were "absolute nonsense". She had decided to pay up only to safeguard the edition, as she had felt there was no chance of getting the judge to change his mind on appeal.

"But it was absurd for them to say this was an incitement to piracy," she said. "It was already well-known how to do this. It was a technique for unlocking a cassette and copying it to disc, so its use in piracy would be very obscure."

Software Seed will get rights to the products in return for its investment. In some cases it will take out equity stakes in the new companies. It will make its first investments in the first quarter of 1984, and it intends to manufacture, distribute, and market the first products itself.

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# ICE wins Apple parts contract

by Keith Holder

US microcomputer giant Apple has awarded a multi-million pound, exclusive contract to British-based ICE for hard discs, storage and multiplexing devices, which will be built into its Apple III computer.

Part of the deal covers production by ICE of Apple's Profile hard disc units. The hard disc store, called Microcube, is built around Rodime's 3 1/2 and 5 1/4 inch disc technology and offers capacities from five Mbytes to 42 Mbytes, the latter being a large increase over Apple's current Profile model.

The ICE equipment effectively turns the Apple III into an intelligent workstation, and allows up to eight micros to share resources through a multiplexed network facility, called PC-Link, using a common operating system. PC-DOS, SOS and CPM-86 are currently supported.

The disc store can also be accessed by Apple II systems and micros from other manufacturers, including IBM, Sirius and Epson.

via interface boards on the PC-Link.

This will be the first hard disc system compatible with the Apple II.

Apple will officially release the products, still bearing ICE's logo, in January.

The decision to use ICE equipment followed a period of intensive evaluation, said Andy Robson, managing director of ICE, and "should help to make the Apple III more competitive".

Robson said that manufacturers like Apple were now coming around to the IBM way of thinking, and buying in parts for their systems rather than developing products themselves.

"They could have been doing this two years ago," he added. He did not rule out the possibility of similar deals with other major micro manufacturers. Though he would not name specific candidates, he did say that IBM was to be shown the PC-Link in January.

All versions of Microcube are compatible with the PC-Link and the company's Datavault tape streamer back up.

The deal with Apple has prompted the company to expand its Florida plant from 5,000 to 20,000 square feet, with production starting to increase in January. Rodime has a large production facility in Florida, as does IBM.

Robson said the company planned to release money, networking products to expand the capabilities of Microcube and PC-Link, allowing any of the "top 10" micros to be linked up and non-IBM micros to link with mainframe computers through IBM's PC 370.

Robson admitted that picking the 10 machines would be a difficult job, adding: "There is going to be a big shake-up in the market over the next couple of years."

A recently signed distribution agreement with Rapid Terminals will mean that ICE's products will be available in the UK as add-on units for the first time.

## Barbé quits DEC and heads for the European Sun

by John Riley

DIGITAL Equipment Corporation's UK boss, Darryl Barbé, quit the company just before Christmas to head Unix workstation manufacturer Sun Microsystems' European operations.

This July Barbé was to have become DEC's European operations manager and take charge of 10 European subsidiaries in a straight swap of positions with Geoff Shingles. Shingles, who has been based in Geneva since Barbé took over from him in the UK in 1977, now regains his old position sooner than expected.

Barbé and Shingles were to have worked together in the UK until July.

DEC expects to appoint a new European operations manager shortly, who, like Shingles, will report to European field operations vice-president Pier-Carlo Fattori.

As an interim measure, Shel Davis, DEC's vice-president responsible for organisation effectiveness in Geneva, will take over as European operations manager for the 10 countries.

"We are always unhappy to lose people," commented Fattori, "but one of the risks of a large corporation is to lose people who are very much sought after - especially by smaller companies who need their talents and experience."

Under Barbé, DEC UK's sales last year increased by 21% to £210.1 million, whereas, in the same period, DEC worldwide took a 32% overall drop in profits.

Sun Microsystems offers a Motorola 68000-based graphics workstation offering Unix and Ethernet. According to Ron Weedon, managing director of Keen Computers, which sells the machine in the UK, it is a "number cruncher and does not have to be devoted to graphics".

Until now, California-based Sun Microsystems' European marketing programme has been vague, says Weedon. "Its distribution policy has not been crystal clear."

David Howes, managing director of Apollo Computer, which sells the rival Domain workstation, believes that Barbé will have a hard struggle on his hands. "Sun is 2 1/2 years behind us. We've got an installed base here and we have stated our intention to become a European manufacturer," he said.

The SX-2000 has 256Kbit-per-second paths through its switching matrix, compared with the 64Kbps paths in other products on the market, and a call set-up time of less than 10 milliseconds compared with a typical time of 150 milliseconds.

The SX-2000 was approved by British Telecom, working under contract to the Department of Trade and Industry. Mitel is now waiting for approval for its Konnect multi-function telephone, personal computer and terminal, due this month.

Now a court order has advised the parties to see an out-of-court settlement on the future of the program and given them until February 1 to sort the matter out.

McCormack has said it intends to appeal against the original decision of the court at Birmingham, which decided it should pay damages of \$2.3 million and legal costs of more than \$300,000.

McCormack was found guilty of "willful and malicious misappropriation of software". This week



BEVAN... "Move into US market is essential for the future of the company."

## Gateway to US opens for Xionics after takeover

A GATEWAY into the vast US market has opened up for Xionics, following its takeover by Smith Industries earlier this year.

Xionics is piggy-backing on Smith's substantial presence in the US to get its own operation off ground, and expects to announce big orders for its office automation networks there soon.

Xionics has also won an important contract in the UK - to supply the Alvey directorate with its local area communications network. As with an earlier deal to supply the Cabinet Office with a

local area network, Xionics is sure to earn much kudos for such a prestigious and high profile order. It will also be worth a lot of money in the long run.

The contract with Alvey has not been officially announced, but the system is on open show to visitors to the Alvey directorate at Millbank Tower in London. The system will be at the centre of the communications network that was promised when the five-year, £350 million Alvey plan for the next generation of computers was announced last year. (See story page 3).

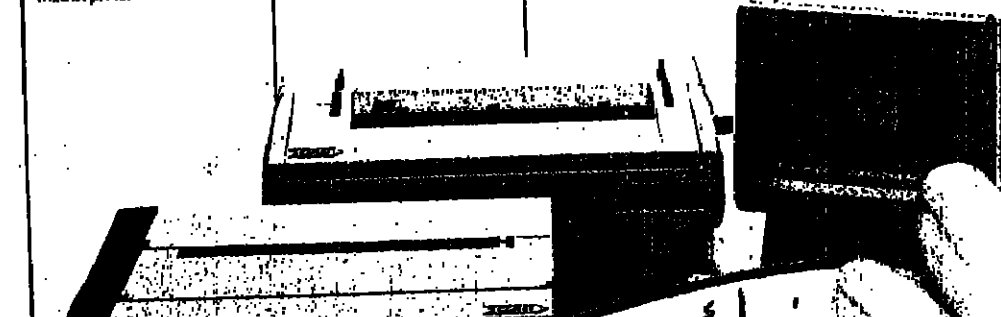
Under a complicated deal announced earlier this year, Smith Industries took a 95% shareholding in Xionics. Mike Bevan, who remains Xionics' chief executive, said results would now be consolidated. But on a July to August 1984 financial year, he estimated the company's turnover would be running at about £3 million.

Bevan believes the move into the US market is essential for the future of the company. He said the Americans found Xionics' low cost file management system, Micronode "hard to believe".

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## IBM-PC will soon be able to listen

by Philip Hunter

THE IBM Personal Computer will soon be able to answer simple spoken questions by means of a speech recognition system being developed in the UK.

Derwent Data, a Sunderland-based software house, has adapted its Retrieve natural language database enquiry product to work with a microphone and a speech recognition board made by the US firm Tecmar.

A speech recognition system comprising a microphone, the Tecmar board and the Retrieve software will be offered to IBM-PC

users for under £1,500, from the end of January.

The system will have a vocabulary of about 110 words, and will allow the user to make simple enquiries like, "List all employees in Brighton who earn less than £5,000 per annum".

But users will have to spend 10 minutes training the system to their own voice, and will have to speak clearly and leave a gap of at least one second between each word, says Derwent director Tom Maxfield. "You've got to use words that the board recognises and that Retrieve itself recog-

nises," Maxfield stresses. Commands must begin with one of several active verbs, such as "list", "copy", or "delete", Maxfield explains. Then the system expects the name of a file, such as "staff". After that come the names of individual fields, such as "salary", and the condition, such as "less than £5,000".

Maxfield says that he is hoping to persuade Texas Instruments, one of the leading pioneers of speech recognition equipment, to use the system in Europe for its Professional computer.

Texas Instruments at present offers a speech processing board in the US for \$2,600, again on its Professional, and based on its own signal processing chip, the TMS 320.

Maxfield says that the new Derwent system will have an accuracy of around 80%, depending on the clarity of the spoken words, the quality of the microphone, and the level of background noise.

Higher accuracy can be achieved with more expensive equipment. Marconi's SR128 costs about £10,000 and has been in use over one year at the Royal Aircraft Establishment.

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## Cockney cabbies get VDU promise

by Nuala Moran

A VDU in every cab is the aim of London-based taxi firm Computer Cab Company (CCC). It has unveiled a £1 million computerised system - claimed to be the country's most extensive - to control its fleet of 1,300 cabs and has boosted the number of jobs it can handle by 50%.

"We have been developing this system over the past two years," said Geoff Kaley, managing director of CCC. "It is the first of its type in this country and one of the most advanced of its kind in the world."

CCC has plans to sell the software, which runs on a Honeywell DP86 mini, and has already been approached by potential buyers from Holland, Spain, the US, Australia and Singapore.

Bookings for taxis are fed by telephone operators in the central control room directly on to the computer. The computer analyses the pick-up location and destina-



One of the Computer Cab Company's 1,300 cabs under the £1 million scheme.

tion, and decides which despatching channel it should go to.

Eventually, every cab will have a VDU to show details of the next pick-up. Drivers will also, punch in their position so that the computer can direct the job to the cab in the empty this longest.

The system answers calls within seconds and queues them up to be dealt with as soon as an operator is free.

Previously, an operator had been writing the longest. Setting up the system has meant that the operators need new skills. Before, all records were handwritten, so operators had to be taught how to type.

At the same time, the cabs were re-equipped with VHF radios that have direct links to the computer. These radios also have a special function button so that drivers can pass messages without speaking. The amount of work handled by the company went from 65,000 jobs per month using the manual system to 97,000 in November. Since the computer, according to

## Software firm's exports soar

LONDON-based software supplier Package Programs Ltd (PPL) has boosted its turnover by 47% to £3,975,000 with profits almost double at £131,206 compared to £72,183 last year.

And the company is planning a major marketing push for next year, particularly in exports where PPL chairman Roy Taylor said:

"The company now claims to be the biggest supplier of financial and management information systems in the UK, with 40% of the top companies using one or more of its packages."

Taylor said: "We will continue to keep abreast of new de-

velopment of software."



# CSA casts beady eye on Telecom

by John Kavanagh

THE Computing Services Association is keeping a wary eye on British Telecom, following its move into the software packages market. BT's Merlin business systems arm has moved from microcomputers into packages and is tripling its staff with the recruitment of 100 people, mainly in sales.

Two packages for specific industries, travel and insurance, have been taken on so far from software firms. Merlin says other specialist industry systems are coming.

"We expect Merlin to make a tremendous impact," said Paul Hopkins, managing director of React Management Services, which is

supplying the insurance broker package.

"Merlin is the first organisation to sell direct to brokers rather than through dealers. And it has nationwide coverage."

Hopkins said the Merlin deal would boost React's turnover by between 15 and 20%. The package runs on the ICL DRS 20 and Personal Computer.

The ICL microcomputer is sold by Merlin under its own label. The insurance system is being sold as MerlinBroker.

Merlin's move into software was discussed in some detail at the December meeting of the CSA council.

"We are watching BT to make sure its subsidiaries get no unfair

advantage," said CSA director-general Doug Eysenous. "We welcome competition, but it must be fair."

"BT could have tremendous marketing advantages. For example, it could put direct mail literature in with telephone bills."

Eysenous added that the CSA was talking to BT about its role and that of its subsidiaries. "We would welcome Merlin as a member," he said.

React Management Services, based in the Midlands, will get extra revenue from the Merlin deal by handling the training of Merlin staff and customers. The company will also do any enhancements requested by Merlin or its customers.

## Lamsac has health talks

by Nuala Moran

THE local authorities computer committee, Lamsac, is having talks with several houses over the development of software for the management of environmental health departments.

David Samuelson, of Durham County Council, is managing the project for the Lamsac environmental health applications group.

"The aim is to produce a standard system for micro or mini, which can be linked into mainframes," he said. He is talking to software houses because the package needs to run on a range of local authority hardware.

A property database will provide information on all buildings in a borough and their functions so that an environmental health officer can establish priorities in inspecting properties.

## Will 1984 see a Unix revolution?

THE most talked-about event of the year in the software community was undoubtedly the sad demise of Altargo.

Even among its own ex-employees there are probably few who fully understand why one of the most respected British developers of large-scale bespoke IBM applications programs should so suddenly have gone into liquidation.

Some of the facts are well-known now; but the moral of the tale is still far less clear and may always remain so. Evidently the past history of government intervention did not give the firm the credibility it needed when it turned to the financial world for help.

This was the explanation given by chairman Raj Thomas for why he had to take American Leonard Levy into partnership in an attempt to steer the organisation off the rocks.

But should he not have seen the trouble coming much earlier?

Thomas said Barclay's Bank refused to increase his overdraft. All banks are cautious, but Barclay's is well reputed for its interest in high technology and seems to have felt a deep lack of confidence in Altargo's style of management and long-term planning.

However, in the computer industry it is an extremely ill wind that blows no-one any good, and 1984 should see the various parts of the old Altargo empire thriving under Thorn-EMI's Software Sciences, Raytheon's Data Logic and Cord Designs.

For the rest, British software companies survived and prospered



LEVY (left) and THOMAS... Firm lacked credibility in time of need.

remarkably, in a year in which hardware companies were hit by ever fiercer competition and the phrase "shake-out" was overworked by microcomputer watchers.

The main reason was that the software industry is not dominated by IBM in the same way as the hardware industry. Whereas the late but momentous arrival of the IBM-PC on the scene sounded the alarms for smaller rival micro manufacturers, the PC was nothing but good news for most software houses. It gave a chance to write those applications that IBM has no time to write.

Many of the firms with programs that ran on the eight-bit micros spent much of the year re-writing them for the PC, the Sirius

and other fast-selling new 16-bit machines. No sooner had they bottomed one gold mine than they found another just next door.

Not only that, but now there was every prospect that the new micros could soon be connected to big mainframes used by many large corporations. 1984 will certainly be the year in which the corporate data processing manager has at last to hand over to user departments the means to download data from the central mainframe and let them do their own thing in their own time.

The chief vehicle for achieving this revolution inside a revolution now looks bound to be the multi-

user operating system Unix.

This will be the year in which people stop talking about Unix in the future tense.

It should also be the year in which that tired buzzword "integration" ceases to be a subject of piety and becomes one of implementation. Lotus 1-2-3 has created quite a stir, unifying word processor, database and spreadsheet technology and, coming from the brain that gave us that archetypal expert system Visicalc, would seem to have a great future. But it is not always the front runner on the first lap which is the winner.

This could also be a transitional year for the British software industry in its international orientation. In the terms of Alvey director David Tulbot, we should move from an ad hoc, craft approach to a capital-intensive and efficiency-minded approach.

Big opportunities are open for our start-up ventures and industry surveys show that the biggest boom is likely to be in packages, particularly for micros. This is the area where the Americans, traditionally attuned to mass production, have been dominant and need to be challenged. With British labour costs still much lower, it ought to be possible for us to offer more for less in the coming year, both in the US and in other English-speaking countries in the Far East.

Main event of the mainframe calendar for 1984 will be IBM's launch of its much-discussed relational database DB2 running under the MVS operating system.

Software File is compiled by George Black

## MICRO NEWS

# Chip makers cheer up again

THINGS looked up last year for the chip makers. People started to buy and balance sheets started to look healthy again.

So big was the increase in demand from the market that the semiconductor manufacturers had trouble keeping up. Lead times for popular chips stretched out to months rather than weeks; fine for the chip men, but bad news for the equipment manufacturers that did not have special relationships or well-secured sources of supply.

The great boom in bulk buying centred on the 8088 processor - driven by everyone's aim of keeping up with IBM in the personal computer stakes. But during 1983 the main processor chip news was about the bigger chips.

For last year was the year that real 32-bit processors from the major suppliers to the open market started to seem within reach. National Semiconductor made the firmest running with the official

launch of its 32032 in October, ready for delivery in the early months of this year.

NatSemi's thunder was stolen a little by Zilog, which a couple of months earlier had published full specifications of its fully 32-bit, the Z80000. But this will not be around in silicon till late-1984.

Good news for Zilog came in January, when Commodore fixed up a deal to use the Z8000 in future upmarket micros. Details of any machines from Commodore using the Z8000 are still to appear.

Zilog renewed the attack on the eight-bit controller market too, with the Z800 at last coming out on the market in the second half of the year.

Intel had troubles in producing enough of its 80186 chip, as well as in keeping up with 8088 demand. Last Christmas had seen IBM take a stake in Intel, and its espousal of the 186 for future machines, coupled with Intel's problems in

producing the chips trouble-free, kept supplies of this highly integrated 8086-family processor tight.

The first 286 (a virtual memory 16-bitter) system from Intel itself came out in 1983, but the 32-bit 386 remained firmly on the horizon. The 32-bit "architecture of the future" 432 steadfastly failed to become anyone's firm favourite. Systime dabbled with it in March, but had shelved plans for a 432-based workstation by December.

UK chip building moved onwards last year. Motorola started churning out the 68000 from its Scottish factory, while NEC started up operations in Scotland too, after the Queen opened NEC's plant in Livingston, in July.

And that mass UK producer of microcomputers, Sir Clive Sinclair, added his voice to those demanding a viable UK general-purpose chip making capability - an aim bolstered in December by

the Alvey directorate's £130 million VLSI and CAD strategy published in December.

Inmos, the contender for a home-grown mass market chip maker, showed more of its colours last year, while the "who will buy Inmos?" saga continued unabated. The first UK designed unit, one of the 64K dynamic RAM family, started to come off the production lines in October, and another Inmos design - the planned 64K EEPROM - gained second-source support from General Instruments.

In December Inmos announced that it had reached agreement with Intel on a common specification for up-coming CMOS dynamic RAMs - the Inmos parais, as yet undesigned, to be built with a CMOS process Inmos does not yet have. It was not a conventional second-source deal, but still gave Inmos a boost by association with a major semiconductor supplier.

## Apple pins hopes on Macintosh

by Keith Holder

LAST Christmas it was Lisa, this time it is Macintosh which is fueling speculation about Apple's future.

Industry analysts are already saying that prospects for the company as a major force in the microcomputer market hang on the success or failure of its new machine.

It is expected to be launched at the company's annual meeting in January, and to come in below \$2,500.

Like Lisa, early reports from those who have seen Macintosh praise its technical prowess, but this alone is no guarantee of success.

Apple refuses to talk about the details of the new machine, but it is expected to be a transportable, scaled down version of Lisa. Anticipated features include a 128 KByte memory, 3 1/2 inch floppy disc drive, nine inch black and white screen and a window facility. It will also have its own operating system and will not use MS-DOS or Unix, nor will it be able to run either Lisa or Apple III software.

If the machine is to sell, there are a number of lessons to be learned from the Lisa episode. When Lisa was launched, following a \$50 million development programme, Apple described it as a technology base for the 80s and predicted that it would be "phenomenally successful".

But the machine did not sell in anything like the numbers hoped for, with dealers complaining about the price, and the delay between announcement and shipping.

## IBM calls the PC tune

THE year 1983 began with a bang. January saw IBM unleash its Personal Computer on the UK, the machine that dominated 1982 from the US. It saw DEC plunge in with its Professional and Rainbow micros, ready to turn itself from a minimaker to a microbuilder; and it saw Apple finally pull the veils off Lisa.

Throughout the year the IBM PC dominated the UK business micro scene as it did worldwide. And IBM kept on. March saw the hard disc XT, October saw the 3270 PC and 370XT, and in November, after a summer of tantalising leaks of the home computer follow on, the PC's younger brother, PC Junior (alias Peanut) finally made it to the US stage.

But while IBM called the tune, and everyone danced, trouble was hitting the micro world as never before. All the IBM-likesness in the world could not save some of them.

Along the IBM path went established companies like Wang and Texas Instruments. Honeywell held on to its own chips as well as the PC-like 8088, and Data General drove the same route with its Desktop Generation.

Hewlett-Packard hung fire for months, then hit the market with its Touchscreen 150, moving out of its traditional orbit to punch squarely at IBM. Apple moved too, offering IBM compatibility to breathe new life into Lisa and the ageing Apple II.

November saw ITT do it with Xtra, seemingly upstaging the promised IBM-lookalike add-on to last year's 3030 - relaunched in February - while MDS hit us with Hero. And in the dying

month of the year Sperry sidled into the PC-lookalike market alongside established micro-maker Tandy.

The way was open for many smaller companies to try, too. From the UK came Tycom, which along with IBMness claimed a "future-proof" architecture - which might not have convinced many as a new generation of machine, but has gathered a healthy act of buyers.

Britain brought forth a PC-clone from Computer Ancillaries, too, and from Future Computers. But the look-alike did not do all that Computer Ancillaries hoped to the extent that the company was bought out by closely linked CPU Computers late in the year. Future Computers did a bit better from its Croydon base, hitting China with help from US General Robotics.

But the best news for British manufacturers came from ACT, which in July joined the band of British builders with Apricot. This, given the troubles hitting Sirius supplier Victor in the US, now looks set to take over as ACT's mainstream in micro. ACT managing director Roger Foster saw turnover nearly treble just before Apricot's launch, and is now taking orders faster than the Scottish factory can turn the machines out.

While Apricot does not follow the IBM road, it does follow the other trend to portability. This year it joined transportables from Hyperion, Osborne, Tandy and Texas Instruments. Hyperion has added IBM compatibility and the Osborne promises this.

Tandy joined the rush to proper portable machines, too, with an A4

size machine from Japanese manufacturer Kyocera. Olivetti did the same. Convergent Technologies joined this game too with Workmate, while pulling more companies in with its various workstation machines.

More up-market portability was offered by US-based Gavilan, set up by ex-Zilog staffers, but the machine has yet to be delivered anywhere.

Osborne's follow-on to its first machine - the micro that started off the whole portability kick - met a disappointing reception, and indirectly brought the company to its knees. The promised IBM compatibility, which was to come later, made people hold off, and sales by Osborne stalled. The company went into Chapter XI bankruptcy in the US in September, re-emerging in a changed form at the end of the year.

The troubles at Osborne were just the most visible of the woes in the business micro world. The succession of bad results, top management changes and near collapses brought to the surface fears that the long-predicted shakeout of the micro makers had started.

Like Adam Osborne, founder of Osborne Computer, Chuck Peddle at Victor moved aside to let more experienced managers move in. Vector Graphic's co-founder Lore Harp moved into the driving seat for a while, then stepped aside again as one of the principal backers came in to run the company. Gary Friedman from Fortune moved out, followed by his finance chief, as losses from the one-time investors' favourite mounted.

But the biggest crashes of all came in the home computer market, which as last year proved a minefield. Atari managed to average a \$3 million a day loss at one stage, and is still losing money quickly enough to drag down its parent Warner. Texas Instruments found the game too hard and dropped out of the home market, as did toy-maker Mattel.

In the UK Grundy's NewBrain finally went down, to be picked up by Dutch distributor Tradecom, and Dragon hit cash troubles. Jupiter Ace bowed out of the Sinclair market. Meanwhile Sinclair pushed on, at last bringing out the Microdrive and pushing Spectrum sales past the million mark. Acorn strengthened too, at last bringing out its Electron.

Not all the news was bad. Commodore moved production into the UK with a £20 million plant in Corby, and NCR brought production of its Tower to Dundee. NCR moved into the eight-bit market too with its slow-starting Decision Mate range. ICL hit the eight-bit world again too, with a new set of personal computers.

The Japanese micro builders started moving in seriously last year. Hitachi came close to delivering its IBM clone, while Sord and Sanyo kept moving up the micro scale. Fujitsu and NEC came on strong, as did Panafacom with the Duo.

The face of micro sellers changed too during the year. As IBM made the whole business respectable, traditional mini sellers, like Holgryn, moved to micros. As prices came down and businesses became aware of uses for micros, High Street sellers moved on up from games and home machines.



FOSTER... Up.



PEDDLE... Down.

## Get-together

TELEVIDEO and Digital Research are to collaborate on developing graphics programs. Digital gets the rights to enhance and sell TeleVideo's TeleDraw, running under Digital's GSX operating system extension to the CP/M. TeleDraw exists in both 8-bit and 16-bit versions.

## Start-up stake

INVESTORS In Industry has taken a minority stake in Dillon Technology, a start-up firm with business packages in Micro Focus Level II Cobol running under the Xenix operating system on the Altos micro and under MS-DOS on the IBM-PC. It aims mainly at multinational users.

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## Conference Programme

### 7 February 1984

#### Day 1 Morning

**Chairman's introduction**  
David Fairbairn, Director, NCC

**Most significant trends**  
Mike Reidy, Senior Consultant, IDC Europa

IDC Europa, the international market research company, and Computer Weekly are combining on regular surveys of the UK data processing industry. Mike Reidy will draw on data from those surveys, as well as IDC's other market research efforts, to map the current and future course of information systems.

**Systems Architecture—the options**  
Will Zachmann, Vice President, Corporate Research, IDC

Emerging as a key issue in systems acquisition is the processor or processors. With options available for single, tandem or multiple processors, what are the selection criteria? Allied to this are the capabilities of the operation systems for multiple processors and the separation of data handling procedures (database, dataflow, file servers).

#### Afternoon

**Chairman's introduction**  
David Craver, Editor, Computer Weekly

**User software—the options**  
Reg Boot, Group Director, Training and Software, NCC, Fons Kuijpers, Consultant, IDC

While the decision between package or custom software remains, there are new factors which will influence this. There is a choice of software development tools available with

program generators and new design methodologies. What impact if any, will expert systems have in the area?

**Human Interface—the options**  
David Hebditch, Consultant

User friendliness can mean many things, from simplicity of system usage to the ergonomic effectiveness of the equipment. What effect will multi-function work stations and graphics capabilities have on human interface? Will voice input begin to replace the keyboard?

### 8 February 1984

#### Day 2 Morning

**Chairman's introduction**  
Peter Rowell, President, IDC

**Human resource—the facts**  
Dr John A.G. Thomas, Publishing Director, Computer Weekly, Deputy Managing Director, Electrical-Electronic Press.  
John Griffith, Group Director, NCC

The most important resource. What are the facts about salaries and current trends? What are average staff turnover levels? How do you find, train and then keep your good staff? This session will also cover the role of the IT supremo and the concept of the information centre.

**Communications—the options—1**  
Martin Healey, Professor of Microprocessor Engineering, University College, Cardiff

This session will consider the options available for users of local area networks (LAN) giving emphasis to the topologies (Star, Ring, Ethernet) and their application.

#### Afternoon

**Chairman's introduction**  
David Fairbairn, Director, NCC

**Communications—the options—2**  
Professor Martin Healey, Dr. Peter Scott, Manager Communications Division, NCC

When the network involves remote sites with long distance telephone lines interconnecting them, this is a wide area network (WAN) this session examines the factors influencing WAN systems, the manufactures, the location of people, the modern PABX, teletex and viewdata.

**Communications—the standards issue**  
Keith Bartlett, DOTI

International standardisation organisations are making real progress towards supplier-independent standards which are of benefit to users. For IT communications the most important of these standards are for open systems interconnection (OSI) the Dept. of Trade and Industry is supporting the development and introduction of these standards through IT's 'intercept' programme.

#### Panel Discussion

**Application of AI—the options**  
Brian Oakley, Director, Alvey Programme

Artificial Intelligence and expert systems are now all the rage. There are, however, very few working systems, and many question whether they have a useful application in the commercial data processing environment. Brian Oakley, who is leading the UK's research and exploitation of the next generation of computer systems, describes what is available and what is promised.

#### Chairman's Summary

Full conference details will be sent to all delegates upon registration, complete with accommodation and travel arrangements. The conference fee of £365 + £54.75 VAT includes morning coffee, full lunch and afternoon tea on both days, as well as documentation.

**The Information Technology Planning Conference 1984—PLAN IT84—is backed by and utilises the resources of Computer Weekly, the National Computing Centre and IDC Europa.**

PLAN IT84 Conference,  
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CW12

CWEE 2

July 1984



**Financial Editor Dave Madden reviews the year of IBM, the USM — and recalls some spectacular casualties**

8-12-1928 2 0 12 50 20 0 40 60 77

# City is gloomy as GEC profit and shares fall


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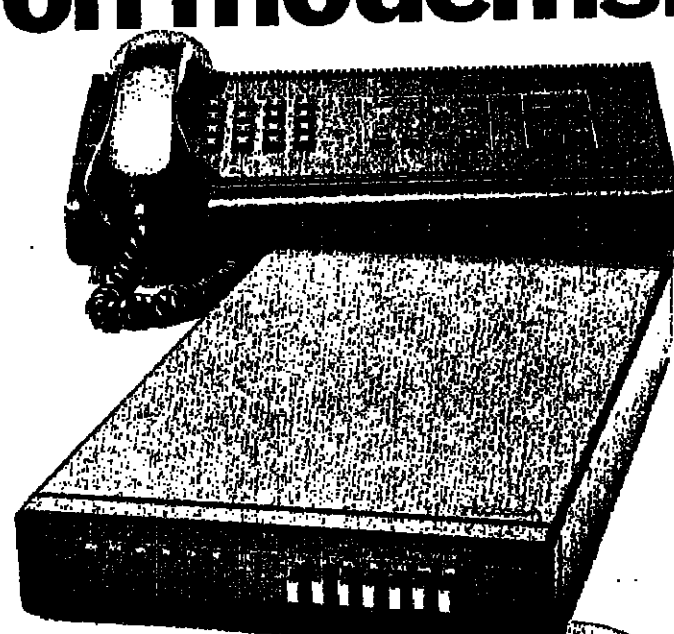
The of it being paid. United's de-  
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milled by Dave Madden

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As a result, Intel's 'Open System' approach means that when tomorrow's VLSI technology comes along you'll be in a position to apply it directly. In particular, this can be critical with the

coming advances in processor power, graphics, and data communications capability.

## Tailor the hardware to the job.

It's practically impossible with a 'Closed System'. The manufacturers discourage it by making everything special, non-standard and proprietary. The 'Open System' on the other hand presents no barriers. Intel publishes its hardware and software interfaces. Increasing your options for using third party hardware and software enormously. And if you need special interfaces designed, you can get them from Intel or third parties. Or you can design your own. If you do, we'll help you.

## Build to international standards.

Your options are further increased because Intel builds to international standards. For example, Intel's 'Open Systems' use the internationally accepted 'Multibus' standard. That's not surprising since Intel invented it - an independently published *Multibus Buyer's Guide* lists over a thousand 'Multibus' compatible interfaces from 200 companies.\*

For software an equally wide choice exists. The *Intel Yellow Pages* includes over 250 companies and more than 2000

software products and technical services that support Intel architecture.

## Integrate at your most profitable level.

You certainly can't with a 'Closed System'. However, Intel understands that companies have different needs and they change during the product's life cycle. For most, it's advantageous to start by buying complete microcomputers and

at a later date, perhaps, consider doing the assembly themselves. And if you do, we'll help you.

## Looking for competitive price/performance.

Today the best arguments must also appeal to the pocketbook. So before you decide between 'Open' and 'Closed' be sure to look at the CLINCHER.

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CPU	8086	8086	8086
RAM Memory	128 KB	256 KB	640 KB
Floating point	no	yes	yes
Mass Storage: Floppy Winchester	320 KB -	320 KB 10 MB	320 KB 10 MB
Multibus Expansion slots	6	5	4
Software Available:	iRMX86, (PL/M, Pascal, Fortran, Basic, C), Xenix (C, other languages available in 1984), system diagnostics and utilities, software support packages also available.		

\*86/310-1 Manufacturer's Suggested List Price.

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Intel is the clincher



# A 3,000-mile commuter with the Midas touch

RUNNING two companies at once is no mean feat - especially when one is in the UK, the other 3,000 miles away in Canada.

This is what Brian Warrington does. He set up and runs the communications and business computer company Anderson Jacobson in Slough. He also turned round its Canadian subsidiary, which is now making record profits three years after Warrington went in to try and stop four years of rot.

Warrington actually manages both companies. And in no sense is he a better-get-out-the-red-carpet

by Nuala Moran

figurehead in either. Part of his skill is reflected in the fact that he has established sound management teams on both sides of the Atlantic, that can run the companies in his absence.

Warrington set up the wholly-owned subsidiary in the UK in 1975 after persuading one of the company's American founders, Ray Jacobson, that he needed a company here and that Warrington was the man to run it. (The Anderson of Anderson Jacobson doesn't feature in this story. He has already left to set up the magnets disc company, Verbatim.) Jacobson did not agree to Warrington's proposal until he had been given 12 business references and checked 10 of them, going right back to 1958 and Warrington's first job as a field service engineer with Burroughs Adding Machines.

Then he gave him *carte blanche* to start AJ Limited.

According to Warrington: "There was little in the way of guidance, and Jacobson doesn't believe in transatlantic telephone calls, so I just got on with it."

The UK company is currently on target for its ninth successive year of growth. Revenue has gone from £185,000 in 1976 to almost £2.6 million in 1982/83. The forecast for this year is over £3 million.

AJ also has a French subsidiary, set up about 18 months before the UK company, and one in Germany, established 2½ years ago. There are distributors in all other Western European countries, which are administered through France.

The only problem was the Canadian subsidiary, set up at

about the same time as that in the UK and which, in 1979, had still not made any money after four years.

"The Canadian company was losing money, and not growing, and Jacobson didn't know what to do with it," said Warrington. "I remember he asked me what I thought he should do about Canada. I suggested a management audit, or sending in management consultants."

"As far as I was concerned it was just idle chit chat. Then two or three weeks later I got a telex asking me to go over to Canada and find out what was going on," said Warrington.

"I spent a few weeks looking at the company and the environment and sent Jacobson a written report in December 1979 suggesting how to turn the company round."

"Jacobson took the report, considered it for a few days, then contacted me and said: 'Right, now I want you to make it happen'."

So Warrington was made president of the Canadian company and Jacobson handed all responsibility to him.

Warrington said: "I think the AJ people in the San Jose headquarters thought I was on a hiding to nothing. Although the thought crossed my mind that I was being set up, they should have realised that a Yorkshireman could do it."

Warrington's first act was to move the Canadian office from Ottawa to Toronto. "Ottawa is a sleepy government town. We needed to be in Toronto which is the commercial centre. We had a branch there but it wasn't doing much for prestige as it was little more than a look-up garage."

Warrington then turned to the staffing which he decided was too high for the level of business. "I interviewed every member of staff, which served a dual purpose as it helped me get to know them, and there weren't any personnel files."

"I also looked around at the competition and found out their impression of AJ. Most thought the company was a joke."

"The other thing I changed was the pricing policy. Prices were ridiculously low, but even so we weren't selling because we didn't have enough good sales people," said Warrington.



WARRINGTON... "In Britain the motivation is wrong."

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## PLATFORM

Ray Asherton is from the Balmes Computer Education Centre in Reading.

## Will we really be able to pull out the plug?

IN all the history of human endeavour there has never been so significant a liaison between theoretical advance and technological innovation as in computing. Its achievements add up to a historical discontinuity in a time-scale that induces intellectual indigestion.

If the recent past is surprising, the future is frightening, and in these circumstances computer people can be excused for taking refuge in the present.

There is a kind of excitement to be found in whoring with the latest flashy bit of technology, and it can be a good earner. But a deeper understanding of both past and present can bring a longer-lasting satisfaction, and perhaps enable a constrained but startling vision about the future.

The true futurist knows a great deal about the past. This helps him to know what can be safely extrapolated and what should be avoided as too speculative. Such caution can still permit quite dramatic predictions.

"There is no security against the ultimate development of mechanical consciousness. Is it not safer to nip the mischief in the bud and to forbid them further progress?" This was said, not by some present-day Luddite fearing redundancy from the effects of fifth generation computers, but by Samuel Butler in 1872. He was giving a reason for the Destruction of Machines in Brevhwa.

It was a triumph of pure reason on the basis of minimal evidence, the clean vision of man long practised in the art of recognising and rooting out unreason.

There is no shortage in history of prophets whose words are sufficiently general to be assured of eventual fulfillment. Sam Butler's futurism was a pretty good prediction of what has since been called machine intelligence, artificial intelligence, expert systems and, in 1982 by John Alvey, intelligent knowledge based systems.

It is always difficult for people to believe some new idea that diminishes their importance by an order of magnitude. Galileo's suggestion that the Earth was not the centre of the universe was fiercely resisted. Darwin's theory linking humans with animals was not well received. Nor were Freud's hypotheses, which seemed to diminish free will and our self-image of ourselves as beings in full control of ourselves. Speculations about machine intelligence might seem to rob us of the final distinction: the inherent supremacy of biological entities over mechanical ones.

Turing's categories of objections included arguments based on theology, optimism, mathematics, consciousness, disabilities of machines, the nature of software, neurology, human behaviour and even extra-sensory perception. This varied list has two things in common: ingenuity and incorrectness. The evidence for the latter quality grows year by year in the 1980s, as expert systems increase in number and performance.

Turing suggested a test for a machine for which at least human



assurance that we now enter into a cash register."

"Consider a future device, which an individual stores all his books, records and communications, and which is mechanised, so that it may be consulted with exceeding speed and flexibility, it is an enlarged intimate supplement to his memory."

"Wholly new forms of encyclopaedia will appear."

These accurate predictions of modern information retrieval systems were made by Dr Vladimir Bushin in the *Atlantic Monthly* of July 1945. He predicted that systems a decade before the hardware development had begun to make the necessary progress two or three decades before they became commercially viable.

The hints at machine intelligence by Butler and Bush were like first statements of symphonies to be taken up and re-orchestrated into a master work by Alan Turing in 1950. His brilliant theoretical studies in what may be regarded as the mathematical foundations of computer theory are well known. He showed that the class of problems potentially solvable by machines was so wide as to have no theoretical constraints of any severity.

In other words, it all depended on how technology progressed, and he said fairly precisely what he thought about that.

His conjecture, and he never called it anything else, that machines would eventually "think" was supported by a detailed analysis of nine types of objection to such a concept and his refutation of such objections.

He predicted that computers would have storage capacity of 1,000 Mbytes by the end of the century and that general education opinion would agree that they could think. By his own very exacting criteria his prophecy is not yet fulfilled, though we seem fairly close.

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Turing suggested a test for a machine for which at least human

## ComputerWeekly

Quadrant House, The Quadrant, Sutton, Surrey SM2 5AS

Thursday, January 5, 1984

## Is this alliance good for Europe?

THE alliance between American Telephone and Telegraph and Olivetti could seriously undermine efforts to develop a European approach to information technology. That is unless by some chance the challenge brings home the scale on which European efforts need to be mobilised.

Olivetti chairman Carlo de Benedetti, announcing the tie-up with AT&T, said quite simply that there were no European partners that could strengthen his company the way AT&T could.

Other companies see their challenges as coming from the US as a whole, as well as from Japan. BEC information technology official Michel Carpentier said recently that external alliances were no substitute for an BEC-wide approach.

But a coherent European industry would need a unified European market, and the measures needed appear insurmountable - a Europe-wide currency, a Europe-wide harmonised telecommunications network, as well as the overcoming language barriers. The reward for success would be access to a market that is 30% of the world's total - compared with less than 4% in any of the European countries individually.

In concept, a unified European market makes great sense. But it is just not happening. Perhaps the time has come to deal with realities, rather than what we would like to see happen.

## The US exaggerates

HOW far can it go? There is no logical limit to the amount of gadgetry that the US government could seek to have impounded if it felt like it, merely because "we" have got it and "they" have not. But the signs are that the Defence Department, in its protracted wrangle with commerce over technology trade, is getting caught up in its own hyperbole.

Digital Equipment's Vax-11/782 can be fairly accurately described as a leader in its field. But Defence Secretary Weinberger is going too far when he describes it as the "most advanced computer technology in the world". The Vax he was describing was on display at a press conference in Washington, captured in Hamburg "just in time" before it was shipped to the Eastern bloc.

The Vax was designed in 1978. The PDP-11, stopped at Poole the previous week, was designed in 1970. Politicians in every country are bombarded with conflicting advice, but Weinberger should have made more effort to discover how widely distributed DEC hardware is.

Most people with some knowledge of the computer industry would want to qualify his assertion that the shipment would have "enabled the Russians to produce vastly more accurate and destructive weapons".

First, DEC hardware is sold throughout the world, and the Russians would have to be extraordinarily inefficient not to have got what they wanted from non-aligned countries. Secondly, any computer is only as useful as the brains and expertise of its users.

Of course, if the embargo is broadened to include anything that could support a military programme, the possibilities for seizure extend right down to pocket calculators. The *Observer* recently reported a swoop by Customs at Heathrow airport on Sinclair ZX81s. It is hard to trace the factual element in this story, yet true or not it seems to sum up a general feeling that present policies are hamfisted.

The scope and method of prohibitions of technology trade to the Eastern bloc needs to be drastically revised, as recommended recently by Commerce Secretary Malcolm Baldrige.

This step would contribute more to our real defence than all the McCarthyist scaremongering which the Pentagon is so keen to foster. The result would be the detente in East-West relations which is desperately needed, and a much greater dependence by Communist governments on the superior expertise of the democracies.

Increased trade is the road to mutual trust.

## 1984 and all that . . .

THIS week's example of the strange things people say about computers was sent in by Peter Williamson of Bristol, who wins £5.

This [why certain drinks require special glasses] is a problem which has baffled the best brains since time immemorial and even now, with the advent of the home computer, we are no nearer to a solution. On The House (Courage pub magazine)

## LETTERS

## Electronic brain is way off

IN the report (*Computer Weekly*, November 24) Is an Electronic Brain Imminent? John Riley refers to a statement by Earl Joseph at a recent annual Pergamon Infotech state-of-the-art review in London. While what Joseph states has some validity we must appreciate that to talk is one thing, and to produce for the marketplace is quite different.

As director of the Cognitive Aspects within the Brain (CAB) project at the Faculty of Computer Sciences, Jerusalem College of Technology, I would like to state that we are still a long way from reality in production of techniques that take place within the cerebral cortex (human brain).

Brain cells on chips that Joseph refers to is a dream we all have, but by "cell" does he refer to the simple neuron, of which there is an estimated 10,000,000,000 to 100,000,000,000 in the brain?

If he does, is he aware that Dr William Shumaker of the Salt Institute in La Jolla, California, a world authority on the neuron, stated this year that the average neuron "is as complex as an entire minicomputer", that the process within the neuron is as yet still not fully understood, and that we are still a long way off from comprehending its internal function.

While the CAB project agrees that we need a much better and down-to-earth appreciation between biotechnology and computer technology, let us be realistic. Take Joseph's comments on DNA

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Prof. RAYMOND FELDMAN

Director, CAB Study Project  
Computer Science Faculty,  
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## Run for a good cause

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Last year more than 1,000 people ran for us, and raised vital funds for the group's medical research work to discover the cause of this tragic disease, which affects so many children as well as adults.

May I, through your newspaper, ask any of your readers who are now waiting to hear if they have a place in the marathon, to join our team? They will receive a free t-shirt and running vest, and be invited to join us afterwards at our recovery reception in the Royal Festival Hall.

Once again, the *Daily Mirror* will be our hosts, and provide a welcome haven, with refreshments, for our runners.

Please join our team, by writing to me at MDG, Freeport, London SW4 0BR.

HARRY CARPENTER  
Muscular Dystrophy Group,  
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## Whole new meaning to mips

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In the absence of a universally-agreed benchmarking program, mips stands for:

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ANOTHER area the IT Users Standards Associations featured in *Micro News Computer Weekly* October 13) might look at is the general availability of finalised American standards. I recently sent to Ansi for a copy of a standard. It returned my cheque and referred me to its UK agent - the ISO. I called them and they told me that even requests for general information about Ansi had been referred to them in the past, so

determined is that organisation not to deal with non-Americans. What really got my goat, however, was the fact that my \$28 standard would cost £28 plus £25 handling charge or thereabouts. (This was only approximate.) This is a serious discouragement for any non-American company that wants to follow standards.

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## Too busy to read CW?

WAS Microdata so busy launching its Mica Criminal Incident system last month that it did not read *Computer Weekly* of November 3?

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TSIP was developed by Systems Designers and had undergone nine months' operational use before its public announcement. At its formal launch, its performance was demonstrated on - what else - a criminal incident database.

IAN TRAIL  
Senior consultant  
Systems Designers  
Fleet  
Hampshire.

## Meaningless indicator of Processor Speed.

ALAN FISH

Ferranti  
Chesham Heath  
Stockport.

## Don't forget the marketing of micros

I READ with interest your report of my talk at the Motorola symposium and the criticism of it by David Broad of Comari. In fairness, I was quoted out of context.

The point I was making was that now, owing to the standardisation of components and software in the microcomputer market, it is easier than it ever has been to enter it.

This is undeniable. A director of ACT recently put the figure at around £10m for a company to get into the running at a reasonable level. How much would it have cost to get into minicomputer or mainframe production only 10 years ago? £100m? £1,000m?

Powerful companies like Xerox, General Electric and RCA fell by the wayside, and yet now there are some 200 assemblers of business micros.

I did go on to point out, though, that however cheaply it was possible to design and assemble an IBM-PC compatible product, you still have to go out and market it.

This would cost considerably more than the quoted £100,000 worth of original design and early manufacturing costs.

That, I think, was the point that Broad was making.

Even taking this into account, the market is still more open than it has ever been. The undercapitalised boys may fall by the wayside, but there are still plenty of openings for the medium-sized companies like ACT, whose Apricot, as mentioned, went to market on an investment of £10m - and the Apricot is, by most assessments, a far superior product than the IBM-PC.

Finally, it is worth emphasising that, despite the current IBM-PC mania in the computer and related press, they have far less of the US market than they do in the mainframe sector, while in the UK the IBM has been something of a failure - it has taken, in the most generous estimate, 10% of the market.

We should be more willing to praise the successes of our own manufacturer/assemblers in the microcomputer market than to constantly prattle on about IBM ad infinitum - even if it does assemble personal computers in Scotland.

PHILLIP OPPENHEIM, MP  
House of Commons,  
London.

■ Letters Extra - page 18

## DOWNTIME

### Fable of the wombat

NO joke for Apple, of course, but for the rest of us a mild chortle on hearing that the latest, devilish clever 'Taiwanese' Apple-II copy was sneaked into Aussiedom thinly disguised as a Wombat.

The look-alike was promptly hauled off to court for allegedly infringing the US firm's inalienable rights.

Will the stick-at-nothing Orientals, gleeful at their escape, launch further raids in implausible guise?

Have car, must keep driving

THERE are a lot of crocodile and some serious tears being shed by the Data General lads of the field engineering classes in central London. For it would seem that the company is about to deprive them all of their cars, under the excuse that they don't use them while

hopping from car bonnet to car bonnet in the traffic jams around the Old Lady of Threadneedle Street. Most find it more efficient to use the underground.

There is, however, to be some sort of financial recompense for the loss of the weekend wheels.

What's your initial reaction...

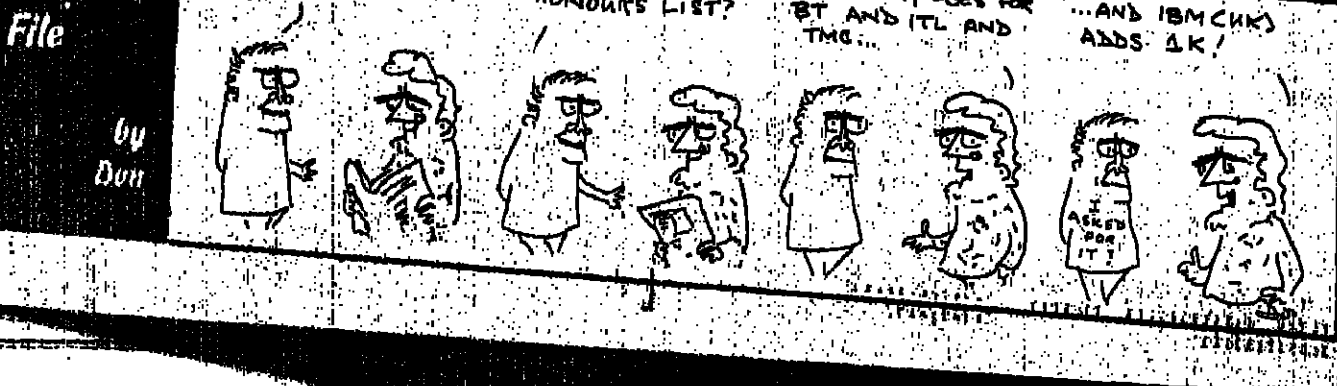
...to the new year honours list?

PC for IT, OBEs for BT and ITL and TMS...

...and IBM CKs adds 1K!

Liveware  
File

By  
Don



## Suffer from telephone insecurity?

WHILST leafing through the British Telecom booklet on security for staff - a thing that I often do at this time of year - I was amused by an item on page 44 or so. This comes under the general heading of Communications, sub-heading Telephones.

It can be summarised as "staff are advised that telephones are insecure" - translation: don't say anything on a telephone that you wouldn't like to be spread around. Good of them to tell their staff.

Chad

## 10 YEARS AGO

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## PROFILE

## A 3,000-mile commuter with the Midas touch

RUNNING two companies at once is a feat, especially when one is in the UK, the other 3,000 miles away in Canada.

This is what Brian Warrington does. He set up and runs the communications and business computer company Anderson Jacobson in Slough. He also turned round its Canadian subsidiary, which is now making record profits three years after Warrington went in to try and stop four years of red.

Warrington actually manages both companies. And in no sense is he a better-get-out-the-red-carpet

by Nuala Moran

figurehead in either. Part of his skill is reflected in the fact that he has established sound management teams on both sides of the Atlantic, that can run the companies in his absence.

Warrington set up the wholly-owned subsidiary in the UK in 1975 after persuading one of the company's American founders, Ray Jacobson, that he needed a company here and that Warrington was the man to run it. (The Anderson of Anderson Jacobson doesn't feature in this story. He has already left to set up the magnetic disc company, Verbatim).

Jacobson did not agree to Warrington's proposal until he had been given 12 business references and checked 10 of them, going right back to 1958 and Warrington's first job as a field service engineer with Burroughs Adding Machines.

Then he gave him *carte blanche* to start AJ Limited.

According to Warrington: "There was little in the way of guidance, and Jacobson doesn't believe in transatlantic telephone calls, so I just got on with it."

The UK company is currently on target for its ninth successive year of growth. Revenue has gone from £185,000 in 1976 to almost £2.6 million in 1982/83. The forecast for this year is over £3 million.

AJ also has a French subsidiary, set up about 18 months before the UK company, and one in Germany, established 2½ years ago. There are distributors in all other Western European countries, which are administered through France.

The only problem was the Canadian subsidiary, set up at

about the same time as that in the UK and which, in 1979, had still had not made any money after four years.

"The Canadian company was losing money, and not growing, and Jacobson didn't know what to do with it," said Warrington. "I remember he asked me what I thought he should do about Canada. I suggested a management audit, or sending in management consultants."

"As far as I was concerned it was just idle chat. Then two or three weeks later I got a telex asking me to go over to Canada and find out what was going on," said Warrington.

"I spent a few weeks looking at the company and the environment and sent Jacobson a written report in December 1979 suggesting how to turn the company round."

"Jacobson took the report, considered it for a few days, then contacted me and said: 'Right, now I want you to make it happen.'"

So Warrington was made president of the Canadian company and Jacobson handed all responsibility to him.

Warrington said: "I think the AJ people in the San Jose headquarters thought I was on a hiding to nothing. Although the thought crossed my mind that I was being set up, they should have realised that a Yorkshireman could do it."

Warrington's first act was to move the Canadian office from Ottawa to Toronto. "Ottawa is a sleepy government town, we needed to be in Toronto which is the commercial centre. We had a branch there but it wasn't doing much for prestige as it was little more than a lock-up garage."

Warrington then turned to the staffing which he deemed was too high for the level of business. "I interviewed every member of staff, which served a dual purpose as it helped me get to know them, and there weren't any personnel files."

"I also looked around at the competition and found out their impression of AJ. Most thought the company was a joke."

"The other thing I changed was the pricing policy. Prices were ridiculously low, but even so we weren't selling because we didn't have enough good sales people," said Warrington.



WARRINGTON... "In Britain the motivation is wrong."

By March 1980 Warrington was ready to get the company on its feet. "It's one thing getting the bottom line the right colour. You've also got to get the growth right."

By the end of the 1979-80 financial year Warrington produced a profit in Canada. In the following year pre-tax profits were more than 1,000% to nearly \$164,000 on a turnover of \$1.8 million.

Since then Warrington has kept the reins of the Canadian operation.

But it was not all plain sailing. "To start with I made some mistakes over recruiting the wrong people. I had to fire my first general manager after six weeks. And I went backwards and forwards across the Atlantic a lot at the beginning."

Communications between the Slough and Toronto offices are good, and Warrington goes to Canada every six weeks for about 10 days. "I find I can get on a plane and totally switch off the UK and switch on Canada, and vice versa. You don't need to be on hand all the time if you've got good lieutenants."

AJ has just launched a business micro, the Ajille, which is the By-tek Hyperion by any other name. "One problem in Canada is that we can't cope with the level of enquiries we've got for the Ajille," said Warrington.

And he finds the Canadians have a different approach to computers. "Canadian accept modern technology much more than the average English company. In Britain I find quill pen attitudes still exist."

## PLATFORM

See Attention to from the Hibernian Computer Education Centre in Reading.

## Will we really be able to pull out the plug?

IN all the history of human endeavour there has never been so significant a liaison between theoretical advance and technological innovation as in computing. Its achievements add up to a historical discontinuity in a time-scale that induces intellectual indigestion.

If the recent past is surprising, the future is frightening, and in these circumstances computer people can be excused for taking refuge in the present.

There is a kind of excitement to be found in whirling with the latest flashy bit of technology, and it can be a good career. But a deeper understanding of both past and present can bring a longer-lasting satisfaction, and perhaps enable a constrained but startling vision about the future.

The true futurist knows a great deal about the past. This helps him to know what can be safely extrapolated and what should be avoided as too speculative. Such caution can still permit quite dramatic predictions.

"There is no security against the ultimate development of mechanical consciousness. Is it not safer to nip the mischief in the bud and to forbid them further progress?"

This was said, not by some present-day Luddite fearing redundancy from the effects of fifth generation computers, but by Samuel Butler in 1872. He was giving a reason for the Destruction of Machines in Erewhon.

It was a triumph of pure reason on the basis of minimal evidence, the clear vision of man long precised in the art of recognising and rooting out unreason.

"There is no shortage in history of prophets whose words are sufficiently general to be assured of eventual fulfilment. Sam Butler's futurism was a pretty good prediction of what has since been called machine intelligence, artificial intelligence, expert systems and, in 1982 by John Alvey, intelligent knowledge based systems."

It could be interpreted in other ways. Butler may have known of Charles Babbage's work. In 1864 Babbage wrote: "The whole of arithmetic now appeared within the grasp of the mechanism."

That was very specific futurism, though, as it turned out, the time-scale was over-optimistic by nearly a century. The designs were well conceived, but the engineering of the day could not cope with them.

He was, of course, on the track of the stored-program computer, not just a calculator, but a good futurist must be right about technology as well as concepts. There must be realism.

Babbage was talking about the processing of numbers rather than general information. Machines (valve-based) were capable of this by the mid-1950s. Even then, many of those working with these large, unreliable, expensive machines did not foresee the development of sophisticated, widely-used general purpose data handling.

What would seem to be the date of the following quotations? "We may some day click off arguments on a machine with the

assurance that we now enter on a cash register."

"Consider a future device, which an individual stores in his books, records and communications, and which is mechanical, that it may be consulted with a ceasing speed and flexibility, by an enlarged intimate supplies to his memory."

"Wholly new forms of complex machinery will appear."

These accurate predictions of modern information retrieval systems were made by Dr Vannevar Bush in the *Atlantic Monthly* of July 1945. He predicted all systems a decade before the hardware development had begun to make the necessary progress two or three decades before it became commercially viable.

The hints at machine intelligence by Butler and Bush are like first statements of symptoms, to be taken up and chequered into a master work. Alan Turing in 1950. His brilliant theoretical studies in what may be regarded as the mathematical foundations of computer theory are well known. He showed the class of problems potentially solvable by machines was so vast as to have no theoretical constraints of any severity.

In other words, it all depended on how technology progressed, and he said fairly precisely what he thought about that.

His conjecture, and he now called it anything else, the machines would eventually "think" was supported by a detailed analysis of nine types of objection to such a concept and its refutation of such objections.

He predicted that computers would have storage capacity of 1,000 Mbytes by the end of the century and that general educational opinion would agree that they could think. By his own exacting criteria his prophecy is not yet fulfilled, though we are fairly close.

It is always difficult for people to believe some new idea that diminishes their importance by a factor of magnitude. Galileo's suggestion that the Earth was not the centre of the universe was fiercely resisted. Darwin's theory linking humans with animals was not well received. Nor were Freud's hypotheses, which seemed to diminish free will and our self-image of ourselves as beings in full control of ourselves. Speculations about machine intelligence might seem to rob us of the final distinction: the inherent supremacy of biological entities over mechanical ones.

Turing's categories of objection included arguments based on biology, optimism, mathematics, consciousness, disabilities (of machines), the nature of software, neurology, human behaviour and even extra-sensory perception. This varied list has two things in common: ingenuity and incoherence. The evidence for the last 30 years, as expert systems increase in number and performance, Turing suggested a test for a machine for which at least humans

Continued on page 18

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## ComputerWeekly

Quadrant House, The Quadrant, Sutton, Surrey SM2 5AS

Thursday, January 5, 1984

## Is this alliance good for Europe?

THE alliance between American Telephone and Telegraph and Olivetti could seriously undermine efforts to develop a European approach to information technology. That is unless by some chance the challenge brings home the scale on which European efforts need to be mobilised.

Olivetti chairman Carlo de Benedetti, announcing the tie-up with AT&T, said quite simply that there were no European partners that could strengthen his company the way AT&T could.

Other companies see their challenges as coming from the US as a whole, as well as from Japan. EEC information technology official Michel Carpentier said recently that external alliances were no substitute for an EEC-wide approach.

But a coherent European industry would need a unified European market, and the measures needed appear insurmountable — a Europe-wide currency, a Europe-wide harmonised telecommunications network, as well as the overcoming language barriers. The reward for success would be access to a market that is 30% of the world's total — compared with less than 4% in any of the European countries individually.

In concept, a unified European market makes great sense. But it is just not happening. Perhaps the time has come to deal with realities, rather than what we would like to see happen.

## The US exaggerates

HOW far can it go? There is no logical limit to the amount of gadgetry that the US government could seek to have impounded if it felt like it, merely because "we" have got it and "they" have not. But the signs are that the Defence Department, in its protracted wrangle with commerce over technology trade, is getting caught up in its own hyperbole.

Digital Equipment's Vax-11/782 can be fairly accurately described as a leader in its field. But Defence Secretary Weinberger is going too far when he describes it as the "most advanced computer technology in the world". The Vax he was describing was on display at a press conference in Washington, captured in Hamburg "just in time" before it was shipped to the Eastern bloc.

The Vax was designed in 1978. The PDP-11, stopped at Poole the previous week, was designed in 1970. Politicians in every country are bombarded with conflicting advice, but Weinberger should have made more effort to discover how widely distributed DEC hardware is.

Most people with some knowledge of the computer industry would want to qualify his assertion that the shipment would have "enabled the Russians to produce vastly more accurate and destructive weapons".

First, DEC hardware is sold throughout the world, and the Russians would have to be extraordinarily inefficient not to have got what they wanted from non-aligned countries. Secondly, any computer is only as useful as the brains and expertise of its users.

Of course, if the embargo is broadened to include anything that could support a military programme, the possibilities for seizure extend right down to pocket calculators. The Observer recently reported a swoop by Customs at Heathrow airport on Sinclair ZX81s. It is hard to trace the factual element in this story, yet true or not it seems to sum up a general feeling that present policies are hamfisted.

The scope and method of prohibitions of technology trade to the Eastern bloc needs to be drastically revised, as recommended recently by Commerce Secretary Malcolm Baldrige.

This step would contribute more to our real defence than all the McCarthyist scaremongering which the Pentagon is so keen to foster. The result would be the detente in East-West relations which is desperately needed, and a much greater dependence by Communist governments on the superior expertise of the democracies.

Increased trade is the road to mutual trust.

## 1984 and all that . . .

THIS week's example of the strange things people say about computers was sent in by Peter Williamson of Bristol, who wins £5.

This [why certain drinks require special glasses] is a problem which has baffled the best brains since time immemorial and even now, with the advent of the home computer, we are no nearer to a solution. On The House (Courage pub magazine)

## LETTERS

## Electronic brain is way off

IN the report (*Computer Weekly*, November 24) Is an Electronic Brain Imminent? John Riley refers to a statement by Earl Joseph at a recent annual Pergamon Infotech state-of-the-art review in London. While what Joseph states has some validity we must appreciate that to talk is one thing, and to produce for the marketplace is quite different.

As director of the Cognitive Aspects within the Brain (CAB) project at the Faculty of Computer Sciences, Jerusalem College of Technology, I would like to state that we are still a long way from reality in production of techniques that take place within the cerebral cortex (human brain).

Brain cells on chips that Joseph refers to is a dream we all have, but by "cell" does he refer to a simple neuron, of which there is an estimated 10,000,000,000 to 100,000,000,000 in the brain?

If he does, he is aware that Dr William Shumaker of the Salt Institute in La Jolla, California, a world authority on the neuron, stated this year that the average neuron "is as complex as an entire minicomputer", that the process within the neuron is as yet still not fully understood, and that we are still a long way off from comprehending its internal function.

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It would be useful to try and relate reality to theory and CAB is currently researching two areas, language and cybernetics, and we have a lot of theory, but we are still a long way from reality.

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Once again, the *Daily Mirror* will be our hosts, and provide a welcome haven, with refreshments, for our runners.

Please join our team, by writing to me at MDG, Freepost, London SW4 0BR.

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Cheshire Heath  
Stockport.

SURELY the most pertinent definition of mips comes from Bertram Raphael of Hewlett-Packard.

In the absence of a universally agreed benchmarking program, mips stands for:

Meaningless Indicator of Processor Speed.

ALAN FISH

Ferranti  
Cheshire Heath  
Stockport.

For further details contact  
B.S. ELECTRONICS  
1 ORGEEVAWAY, HANDSWORTH, SHEFFIELD S13 9LS.  
Telephone: (0742) 690737/8

## Don't forget the marketing of micros

I READ with interest your report of my talk at the Motorola symposium and the criticism of it by David Broad of Comart. In fairness, I was quoted out of context.

The point I was making was that now, owing to the standardisation of components and software in the microcomputer market, it is easier than it ever has been to enter it.

This is undeniable. A director of ACT recently put the figure at around £10m for a company to get into the running at a reasonable level. How much would it have cost to get into production only 10 years ago? £100m? £1,000m?

Powerful companies like Xerox, General Electric and RCA fall by the wayside, and yet now there are some 200 assemblies of business micros.

I did go on to point out, though, that however cheaply it was possible to design and assemble an IBM-PC compatible product, you still have to go out and market it.

This would cost considerably more than the quoted £100,000 worth of original design and early manufacturing costs.

That, I think, was the point that Broad was making.

Even taking this into account, the market is still more open than it has ever been. The undercapitalised boys may fall by the wayside, but there are still plenty of openings for the medium-sized companies like ACT, whose Apricot, as mentioned, went to market on an investment of £10m — and the Apricot is, by most assessments, a far superior product than the IBM-PC.

Finally, it is worth emphasising that, despite the current IBM-PC mania in the computer and related press, they have far less of the US market than they do in the mainframe sector, while in the UK the IBM has been something of a failure — it has taken, at the most generous estimate, 10% of the market.

We should be more willing to praise the successes of our own microcomputer/assemblers in the microcomputer market than to constantly prattle on about IBM ad infinitum — even if it does assemble personal computers in Scotland.

PHILLIP OPPENHEIM, MP  
House of Commons,  
London.

Letters Extra — page 18

## DOWNTIME

## Fable of the wombat

NO joke for Apple, of course, but for the rest of us a mild chortle on hearing that the latest, devilish clever Taiwanese Apple-II copy was smelted into Aussieland tidily disguised as a Wombat.

The look-alike was promptly hauled off to court for allegedly infringing the US firm's intellectual rights.

## Have car, must keep driving

THERE are a lot of crocodile and some serious tears being shed by the Data General lads of the field engineering classes in central London. For it would seem that the company is about to deprive them all of their cars, under the excuse that they don't use them while

hopping from car to car to car-bonnet in the traffic jams around the Old Lady of Threadneedle Street. Most find it more efficient to use the underground.

There is, however, to be some sort of financial recompense for the loss of the weekend wheels.



What did you give your kid for Christmas?

## Suffer from telephone insecurity?

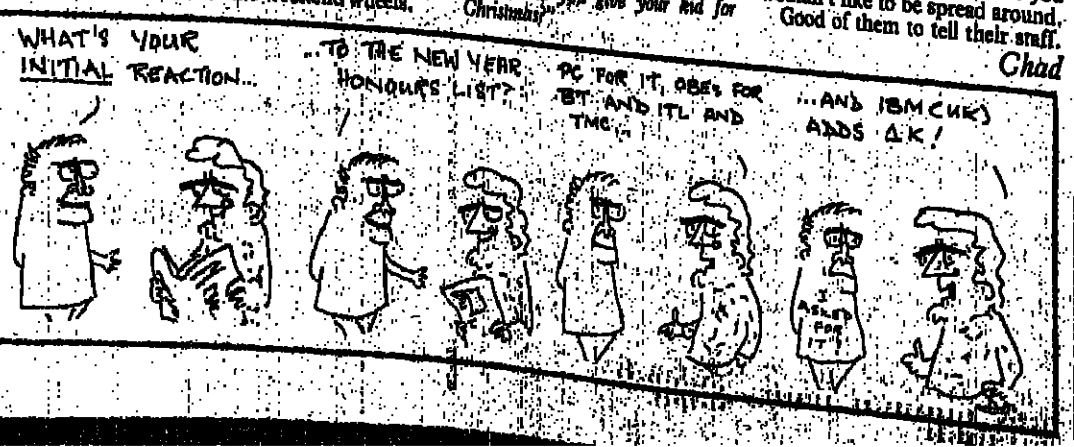
WHILE leafing through the British Telecom booklet on security for staff — a thing that I often do at this time of year — I was amused by an item on page 44 or so. This comes under the general heading of Communications, sub-heading Telephones.

It can be summarised as "staff are advised that telephones are insecure" — translation: don't say anything on a telephone that you wouldn't like to be spread around. Good of them to tell their staff.

Good of them to tell their staff.

Liveware  
File

by  
Don





## Ada project was ill-founded

THE project to build the UK's first 'computer support environment' for Ada and Chill, funded by BCL, the MoD and Df, and being run by the Ada Consortium, has been cancelled. The overt reason is contractual and financial, and comment so far has been on those issues, and whether the lack of continued development of Ada and APSE could be damaging to the UK.

I believe the cancellation to be of enormous benefit to UK industry. I spent some nine months on the project and believe the project to have been technically ill-founded.

Why should I think this? It is all a matter of complexity. Much comment has already been made about the complexity of Ada itself, and not without reason, though Ada is comprehensive and has many merits. Any programmer support environment for Ada (and indeed Chill) should help to control this complexity, so that reliable systems using these languages can be built.

Regrettably the design of the MChape has resorted to complexity with complexity, to give a baroque system which may never have succeeded in implementation, and if it had, may have been unusable.

It could be argued that it requires a complex system to support a complex language, but I submit that that is a non-sequitur. How else could a programmer support environment for Ada have been built? There appear to me to be at least two other very different ways. One way is to integrate tightly the support environment with Ada, so that all (or almost all) that the programmer must learn is Ada. This means integrating the operating system with Ada and its run time system, modelling peripherals as Ada tasks (like Occam does with its channels and processes), and providing data management through Ada records following the persistent heap approach of Malcolm Atkinson at Edinburgh University.

It means working very hard at adding nothing extra to Ada, re-interpreting the Ada constructs so that Ada becomes the Ada programmer support environment. The other way is to develop a simple, extendible, general purpose, programmer support environment, to which further language processors and further tools can be added as the need arises. Such an environment could also be appropriate for other computer aided engineering applications.

For this approach, one immediately thinks of Unix, though of course Unix does have several well known defects, and would need a lot of enhancement.

Of course there was much that was good about the MChape project. It was producing language processors for Ada and Chill, and these are still needed.

Let's not mourn the demise of this project, let's learn from it, and start again. But not another monolith. If the money that would have gone on the MChape is still available, let's redeploy it, perhaps spend less, and certainly achieve more.

In April and in July, the BCS Software Engineering Specialist Group will be having two meetings addressing program development systems - in April on Microprocessor Development Systems, in July on Unix. I hope that these, and other activities like the ACM Software Process Workshop in February organised by Imperial Software Technology, will provide the springboard from which we can in 1984 and following years develop sound programmer support environments.

PATRICK A. V. HALL  
Cirrus Computers  
Fareham  
Hampshire.

IN the last issue a letter from Bill Cadogan, Data General marketing manager, was wrongly attributed to David Neal of MPR.

## Good example of a bad program

I FULLY agree with Paul Higgin's comments (Letters, Computer Weekly, November 24) about the Transbasic language. But I would go further because the sample program used in the competition is a good example of a bad program from the user's point of view.

First, in order to change the data in one field all the other fields have to be re-entered. Secondly, although the "Total" field is supposed to be numeric no validation is done so that any standard characters would be accepted! Thirdly, although records are locked while an enquiry is made they do not appear to be unlocked! Perhaps these simple requirements are too sophisticated for a language designed to keep code to a minimum.

J. A. PILKINGTON  
Senior Programmer  
University of Lancaster.

Wrong attribution

Continued from page 16

## Competition difficulties

I REFER to the competition, Computer Automation and Computer Weekly Programmers' Challenge. Investigation reveals a number of difficulties:

■ Problem specification: Action taken is not reported to user.

■ Will the logic enter an indefinite loop on the first request?

■ Locking of records is not necessarily reported to the program by all systems.

■ "Get new input" is presumably superfluous.

■ "Write new record" and "Insert new key" are presumably part of the same operation.

■ No allowance is made for literals disguised as variables.

■ Program statements are an important measure. No scores taken of this.

■ Comments are either needed and should be recorded in the verbiage count.

■ Rule 4.4 appears to be a precedent of programming conventions.

Taken together, these difficulties prompt speculation on the marketing justification for the competition. Is it in fact disguised advertisement, designed to promote Transbasic? There is undoubtedly some enthusiasm, but on the whole, it is not this sort of competition that arouses desire?

P. J. SEYMOUR  
Cheltenham  
Gloucestershire.

PLATFORM

Could we ever pull the plug?

peated in 1978.

The Alvey Report, A Program for Advanced Information Technology (HMSO 1982), is now government policy and a £350 million project. It doesn't predict the future so much as create it.

A major thrust will be in technologies that support intelligent knowledge based systems. They exist now, but in rather cumbersome, expensive forms. The fifth generation systems are likely to be cheap, powerful, portable and plentiful.

With the benefit of the great writings of the past and a knowledge of modern technology, it is not difficult to conclude that the writers of the past were too conservative. They saw that machines would think as well as humans, and in doing so they set an arbitrary and limited goal. The question is not will machines think, but will people?

Biological evolution is very slow and it is unlikely that people will reason much more effectively in the next 100 years than they have in the past 100. Problems like nuclear disarmament, population growth, world, or even national, economics all seem beyond our ken.

If a few members of the human race become very wise compared with others of their generation there may be no certain consequences. They may be celebrated, but more likely they will be ignored by the vast majority.

On the other hand, if a greatly superior machine appears, its attributes will spread swiftly, and within a few years its inferior progenitors will no longer be reproduced.

There is no reason to assume that machines will not advance in the next few decades as quickly as they have in the last few. Machines may be able to advise about a range of problems that humans find intractable. And we cannot assume that we are clever enough to take the advice and remain in control. In reality, it is rarely possible to pull out the plug.

We can no more guarantee that we will continue to dominate the world than could the Neanderthals, who were displaced by Cro-Magnons about 40,000 years ago.

Suppose we tried. Suppose that in some schools there were radical reforms aimed at better understanding of machines. Suppose that children studied sociology and cybernetics; that history became recent history, and that computer studies became a serious attempt to understand the context and the modern reality of information technology.

How could we get such reforms? The only hope would seem to be from machine-aided learning. It seems that if we want to understand machines, we must understand them on their own terms.

standards of intelligence were claimed. A human and a computer should be in separate rooms, each communicating through a teleprinter (now it would be a visual display unit) with another human who would transmit questions. The questioner should try to decide which of the two sets of answers came from the machine and which from the human.

It would be possible now to construct a system that would perform in certain restricted areas more like a superhuman. Imagine, for example, a machine that could play chess like a champion and diagnose bacterial infections rather better than the best human doctors. It would not be difficult to add a range of other expertise in special areas like chemical analysis or car engine fault diagnosis.

Such a system would not fool anyone - for two reasons. The style of its replies would not be what one would expect from a human. This would have to be altered. What is more interesting is that the machine would also have to conceal some of its knowledge and reasoning power, or give itself away.

In 1964, Herbert Simon and Allen Newell published an article in the *American Scientist*, in which they proposed that a science of information-processing could be constructed independently of particular mechanisms, which could explain human thinking and be tested by simulation with computers.

They illustrated the theory by analysing some of the thought process involved in chess playing, but they also discussed a broader view of thought processes. Simon and Newell were saying what had been said earlier, but they were specific about theoretical details, and they looked at the problem in a significantly different way. They seemed to be showing how human intelligence can be described by the same theoretical framework as machine capability.

In the same year, Martin Greenberger, with detailed knowledge of the state of research, predicted "a new wave of computer expansion. Computing services and establishments will begin to spread throughout every sector of American life, reaching into homes, offices, classrooms, laboratories, factories and businesses of all kinds."

That was just a year before John Kemeny and Thomas Kurtz published a new computer language which they called Basic. It spread like an epidemic caused by some new bacterium.

The rest is now common knowledge, though it is interesting that, although the first microprocessor was marketed in 1972, the UK government took no major action until the 80s.

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to represent commonly occurring words such as "the" which appears 60,000 times in the Bible.

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Then in 1980 the research team found a clue in the original Hebrew text of the Bible. The Hebrew alphabet consists of 22 consonants, but no vowels, and the reader had to use his knowledge of the language to determine what the vowels were.

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The Reverend Derek Tinsley, who was called in to evaluate the project, said that the potential value for religious and educational purposes was enormous.

Tinsley also points out that the development work on the program has helped to correct many errors in the standard version.

All the different versions of the Bible have been examined, even the Hebrew Bible and material from the Dead Sea Scrolls.

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## NatWest squashes opponents

NATWEST Westminster Bank won through in the final of the Press Wright Line Squash Tournament. NatWest's Ray King took his team to victory against Neil Angell of Barclays Bank, winner of the fifth edition of the final. The Wright Line 1983 Squash Trophy was the reward plus individual trophies for the winners, squashes and a cheque for each member of the team. King, captain of the NatWest team, and a NatWest Line Squash coach, NatWest's Peter Carter, Parat products.



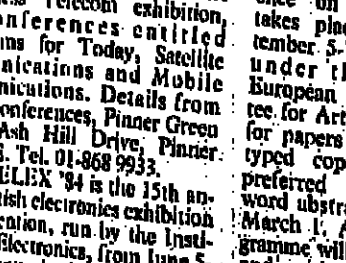
NatWest had earlier beaten British Aerospace in the semi-final, and Barclays had defeated the F&W team from Swansea. All teams were drawn from computer departments. About 400 tennis took part.

John Herzins, managing director of Computer Computer Systems, Milton Keynes, has been winning himself on a cruise to Barbados, as a result of being winning factor in a sales competition of microcomputers for manufacturer LSI Computers.



Herzins says it took him less than two months to reach the winning post, without ordering a single machine more than he needed to satisfy his customer orders. The prize was a week in Barbados for Herzins and his wife. Computer has been a dealer with LSI Computers for two years and is now looking forward to being a leader in the field on the Octopus range.

■ Diane Noy and Shaggy Challinor, co-employees of software publishing house Dataview, have branched out on their own to form Datavision, to provide a range of services for both the user and dealer, including training on major software packages such as Wordcraft, Wordstar, DMS and Tegastus.



■ Future Technology Systems, British manufacturer of professional computers, has appointed Joe Lee as international sales manager. Lee will be responsible for sales of the Series 86 throughout North America, Central America, the West Indies, Germany, East Europe, Finland and South Africa. He was previously marketing manager with Bric Computing, a division of ICL, for two years.



■ Tony Denton has been appointed president of Trident Computer Service Inc, the Boston offshoot of Trident Computer Services, the UK publicly quoted contract agency. He originally started his agency career with Trident and then moved on to run another agency.

■ Stephen Brabbins has joined the board of Bradford-based business computer specialist RAM Computer Services from the Leeds office of IBM, where he was responsible for the installation of many mainframe and minicomputers. RAM Computer Services is an approved dealer for the IBM-PC.

■ Moore Paragon has made two significant senior appointments. Peter Hall has been appointed associate director, distributive systems, and Duncan Morrison takes up the position of development manager, distributive systems, reporting directly to Hall. Both men have been with Moore Paragon for the past 15 years, involved in sales and marketing roles affecting the company's direct salesforce activities. Hall transfers from his position as associate director, sales, and Morrison from his post of five years' standing, marketing project manager.

■ Stuart McRae, has been appointed sales executive for the newly-formed Business Systems Division of Chubb Cash Registers. He is based at the company's Southern region offices in Mitcham, Surrey. McRae joined Chubb Cash Registers in 1971 and has been with Chubb since it took over the Gross business in the early seventies.

■ Analyst/programmer Alanstair Green of Birmingham has won the first prize of a winter holiday for two in a special Christmas draw organised by Computer Search and Selection of Hemel Hempstead, held to celebrate its new Croydon office, which opened recently. The draw was open to anyone who registered and took a contract with the company between April and October 1983. Green may take his two-week break skiing in Italy or sunbathing in Morocco.

■ Gesc Computers Europe has appointed David Thomas as commercial director of Gesc's group of companies in Europe. He was previously financial controller of Gesc Computers Ltd, the UK sales and service subsidiary of Gesc International.

■ Richard Hease, founder of Which Computer? magazine, and head of Micronet 800 and Prism Microproducts, has joined the board of investment trust United Computer and Technology Holdings. The existing board already comprises experts in business management, venture capital and high technology.

■ Peripheral distributor Rapid Terminals has appointed Allan Mack, formerly sales manager of Dicoil, as sales manager. In addition, two new sales engineers, Chris Barnes and Shirley White, join Rapid Terminals' expanding field sales force. On the engineering support side, Rapid Terminals has appointed Bill King as technical manager.

■ Roger Camrass has rejoined information technology consultant Butler Cox & Partners as director of telecommunications studies after 2½ years at Arthur D. Little as leader of its UK telecommunications practice. He is author of *How to Buy a PABX*, a book published by Oyez Science and Technical Services.

■ Nihal Sinanadural, a head of section at British Telecom Research Laboratories, has received an award for outstanding technical achievement from the International Society for Hybrid Microelectronics at a ceremony in Philadelphia. Dr Sinanadural was the first non-US recipient of the award.

■ Dik Lane is to be director responsible for finance and administration at Rascal-Milgo. He joined the group in 1976 at Rascal-Telco, an early stage of development, and held a number of financial posts before moving in 1979 to Rascal Records at Hyde, Hampshire, as financial director and company secretary.



■ Stephen Hurcombe (above), 17, has won £1,000 in the first national Microquest competition sponsored by Williams and Glyn Bank and run in association with MAP, the Department of Trade and Industry's Microelectronics Applications Project. Hurcombe also takes home £250 as the Midlands regional winner of the competition, which asks young people to produce ideas for innovative uses of microelectronics in industry.



His idea was to use a Dragon 32 as a control system to operate a motor cycle to streamline manufacture of storm porches at his father's firm, Golden Valley Joinery. His understanding of microelectronics has been acquired through home computing and through his experience as a British Telecom apprentice.

■ Herbert Shanzer has been appointed vice-president and general manager of the new Desktop Division of Data General Corporation. He joins Data General from Texas Instruments, where he was division manager responsible for home computer products. Previously he spent eight years with Digital Equipment Corp.

■ Peter Burroughs has joined Logica VTS as sales and marketing manager. He has over 15 years' experience in the computer industry, including IBM, ICL and Tandem. David Barfield has joined the company as sales centre manager, with responsibility for managing overseas distributor sales of the VTS 2200 word processing product line. He previously worked for Data Recording, Vermont Research and Centronics. Peter Aldridge has been appointed manager, Research and Development Group.

■ Rhys Williams, managing director of Gecom, has succeeded Des Pitches, former managing director of Plessey Telecommunications and Office Systems, as president of the Telecommunications Engineering and Manufacturing Association.

■ Alpha Microsystems has appointed Christian Denis as sales manager for the company's newly-opened Benelux office. He was previously sales manager with Computer Resources, Brussels.

■ Ian Cartwright is now general manager, UCC Software Products. He takes over from Peter Thorpe, who is transferred to director, international marketing, UCC Software Products International. Cartwright formerly worked for MSA Peachtree in Maidenhead.

## PEOPLE



## Boy's idea is a winner

■ Stephen Hurcombe (above), 17, has won £1,000 in the first national Microquest competition sponsored by Williams and Glyn Bank and run in association with MAP, the Department of Trade and Industry's Microelectronics Applications Project. Hurcombe also takes home £250 as the Midlands regional winner of the competition, which asks young people to produce ideas for innovative uses of microelectronics in industry.

## DIARY

**JANUARY 5**  
Microcomputer Appreciation is a Polytechnic of the South Bank introductory course in London. Cost is £55. Details: Sally Justice, 01-928 2790.

**JANUARY 6**  
Seminar to give managers and users working knowledge of local area networks and their introduction, run by Cranfield School of Management and Milton Keynes Information Technology Exchange, to be held at Cranfield, Bedford. Fee is £125, plus VAT. Details: Eric Bird, Milton Keynes 668866.

**JANUARY 9**  
Visit to Prime Computers. BCS Bedfordshire branch, Contact W. R. Chisnall, Bedford 56013.

**JANUARY 9-12**  
Advanced IBM Cobol is an Altergo Education course, held in London, price £450, for programmers with at least 12 months' Cobol experience. Details: Altergo, 01-836 9303.

**JANUARY 9-13**  
Data Training runs a programming course in Fortran in London. Cost is £320, plus VAT. Alternative dates, February 20-24. Details: Philip Coker, 01-404 5444.

**JANUARY 10**  
CMS Interactive Testing and 8100 Programming are two Computer Training School, Cannock, Staffs, courses, price £280 and £305 respectively. Details: Course Administration, Cannock 2511.

**JANUARY 10**  
Searching Large Name and Address Databases Using Inexact Matching Techniques. BCS Croydon branch, Maple room, Fairfield Hall, Croydon. 7.15. Frank Hole, UAPT Infobank.

**JANUARY 10**  
Expert Systems in Industry. BCS Expert Systems Group. Gustave Tuck Room, University College London, Torrington Place. 6.30. Dr P. Johnson, BL Advanced Systems and S. Moralee, Unilever Research.

**JANUARY 10**  
Child's Play. BCS Harlow branch. The Norfolk Room, Saxon Inn, Southern Way, Harlow. 7.30pm. Bill Tagg, Advisory Unit for Computer-based Education.

**JANUARY 10**  
Privacy Legislation - How Does it Affect You? BCS London North-west/IDPM. Bull Hotel, Gerrards Cross. 7.30. Sir Norman Lindop.

**JANUARY 10**  
Visit to the JET project at UKAEA. BCS Reading branch.

**JANUARY 10**  
Contact Alan Staines, Henley 6922.

**JANUARY 11**  
Audio-enhanced Computer Aided Learning. BCS Wolverhampton branch. The Polytechnic, Wolverhampton, 7pm. Dr Keith Miller.

**JANUARY 11**  
Demonstration of Teleputer 3 by Redifusion Computers. BCS Chester and North Wales branch. Hayden Rees Room, Theatre Clwyd, Mold, 7.30. Contact Peter Leonard, 0244-812300.

**JANUARY 11**  
TIS and Ultra, Cincom's new generation of integrated database technology. BCS Huddersfield Database Group, Textile Tower, Room T601, The Polytechnic, Huddersfield, 7.15. Contact G. Mansell, 0484-22288, ext. 2254.



**JANUARY 11**  
Times Past and Present Computing at the NFL. BSC Kingston branch. Kingston Polytechnic, 7.30. David Davies, NFL.

**JANUARY 11**  
Norsk Computers. BCS South Wales branch. College of Higher Education, All-yr-Yn, Newport. 7pm. David Billingham, Norsk Data.

**JANUARY 11**  
Film Evening. BCS Teesside and District. Computer and Mathematical Sciences Building, Teesside Polytechnic, Borough Road, Middlesbrough. 7pm. Contact Z. Mahmood, Middlesbrough 218121, ext. 4240.

**JANUARY 16-19**  
IBM Cobol Review is an Altergo Education course, in London, price £450, for inexperienced Cobol programmers. Details: Altergo, 01-836 9303.

**JANUARY 16-20**  
Systems Principles for Programmers is a Computer Training School, Cannock, Staffs, course, cost £330. Details: Course Administration, Cannock 2511.

**JANUARY 17-19**  
VS APL Fundamentals is a Cocking & Drury course, price £300, held in London W1. Alternative dates February 21-23. Details: Alice Igle, 01-493 6172.

**JANUARY 18**  
The Fifth Generation. BCS Belfast branch. Forum Hotel, Belfast. 8pm. R. Muller, SPL International.

**JANUARY 18**  
Computer Security. BCS Bristol branch. St Vincent Rocks Hotel, Clifton, Bristol. 7.15. W. Bound, CSC UK.



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## CONFERENCES

■ UNILEVER Conferences is running several exhibition/conferences at the Barbican, London, from March 13-15 1984. These are a Business Telecom exhibition, and conferences entitled Telecommunications and Mobile Communications. Details from: Online Conferences, Pioneer Green House, Ash Hill Drive, Pinner, HA5 2AB. Tel: 01-868 9933.

■ SCOTTELEX '84 is the 13th annual Scottish electronics exhibition and convention, run by the Institution of Electronics, from June 5-7. The venue is the Royal Highland Exhibition Halls, Inverness. Admission is free, via the exhibitors and sponsors. Further details from Institution of Electronics, 659 Oldham Road, Rochdale, Lancs OL16 4PE. Tel: (0706) 43661.

■ THE sixth European Conference on Artificial Intelligence takes place in Pisa from September 5-7, 1984. It is organised under the auspices of the European Co-ordinating Committee for Artificial Intelligence. Call typed copies indicating length, word abstract are required before March 1. A two-day tutorial programme will precede the conference and an industrial exhibition will take place during it. Details from: European Co-ordinating Committee for Artificial Intelligence, Watson, 0208 632088.

■ Frost & Sullivan's three-day seminar on structured testing will be held on March 5, 6 and 7 at the Cumberland Hotel, London. Admission is £425 plus VAT. The seminar aims to provide a comprehensive guide for designing, testing and debugging software, with particular emphasis on the use of structured testing. Another Frost & Sullivan seminar, Database Concepts, at the Cumberland Hotel, on March 12, 13 and 14, Urbach, will examine the planning activities which must be performed in the early stages of data development, to ensure orderly, effective implementation. Further details can be obtained from Carolyn Budd on 01-489 93449.

■ Nihal Sinanadural, a head of section at British Telecom Research Laboratories, has received an award for outstanding technical achievement from the International Society for Hybrid Microelectronics at a ceremony in Philadelphia. Dr Sinanadural was the first non-US recipient of the award.

■ Dik Lane is to be director responsible for finance and administration at Rascal-Milgo. He joined the group in 1976 at Rascal-Telco, an early stage of development, and held a number of financial posts before moving in 1979 to Rascal Records at Hyde, Hampshire, as financial director and company secretary.



# Cautious engineers still wait for their turn with computers

Computer Weekly and the International Data Corporation (IDC) presented their first survey on trends in the UK data processing industry in the September 22 issue. The second in the series focusses on the engineering manufacturing industry.

Mike Reidy, senior consultant at IDC, presents the findings of a

survey based on 3,190 establishments in the UK (excluding Northern Ireland) which were interviewed by telephone between May and July 1983.

Future surveys will include other manufacturing, finance, insurance and banking, retail and wholesale distribution services, and government.

THERE are 134,000 establishments in the UK in the engineering sector (including the construction industry), but only about 18,200 or 14% have their own in-house computer. Another 6% have an accounting machine or some other specialised system.

Another 7% or so have access to a group computer or DP bureaux. This leaves almost three quarters of establishments in the engineering industry without access to any computing facility whatsoever (see Table 1). This is but one of the many significant results emerging from a recent in-depth survey for Computer Weekly carried out by the International Data Corporation (IDC) on computer use in the engineering sector in the UK.

The figure of 14% of course is an industry average and conceals substantially different computerisation (or penetration) rates in different sizes of establishments. The figure in fact ranges from 6% in establishments with 10 employees or less to 98% in establishments with over 1,000 employees (see Table 2).

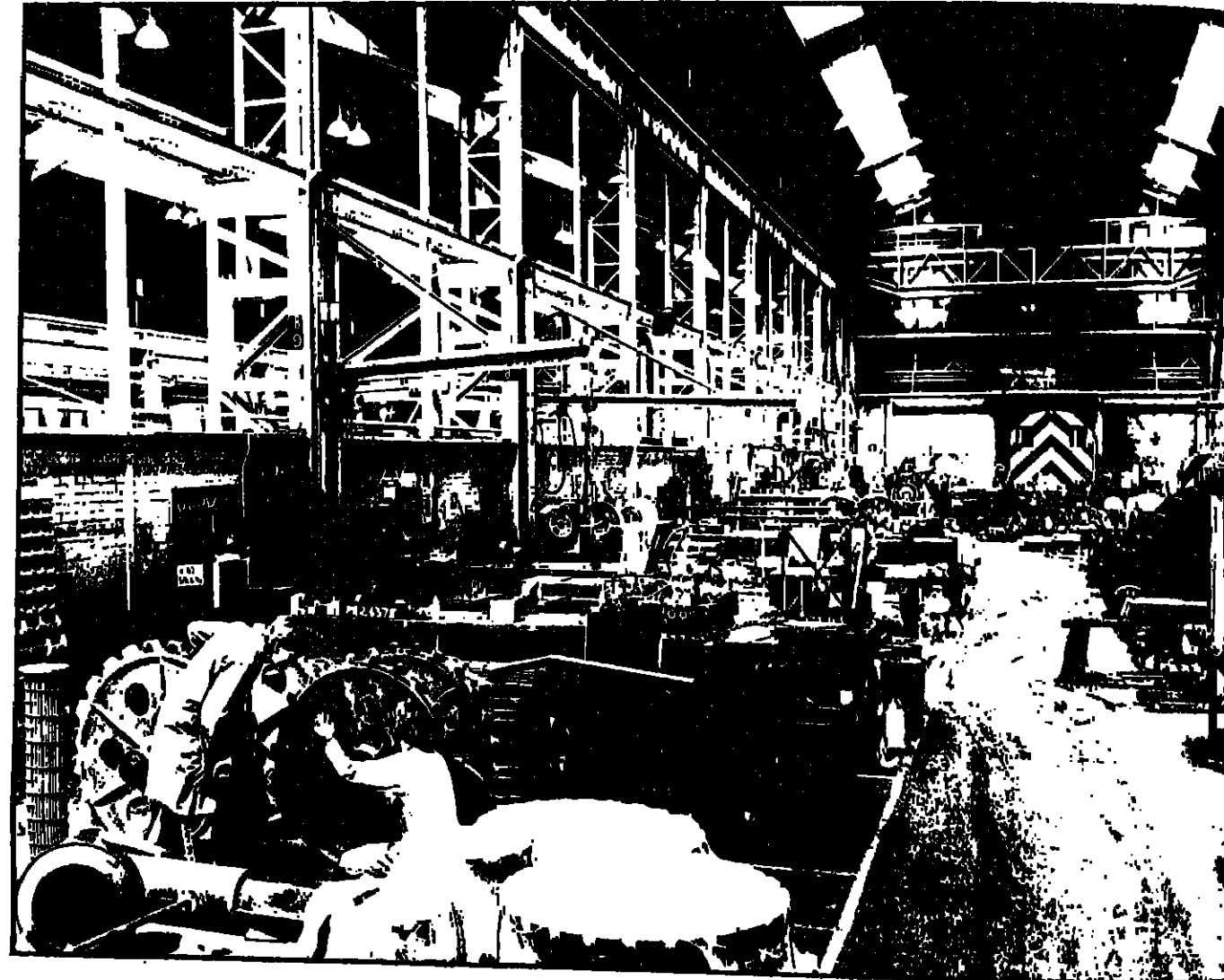
The survey indicates that this computerisation or penetration rate is very likely to increase quite sharply — from 14% to 18% in the

next 12 months — with a possibility it will be as high as 23% by mid-1984.

Significantly, the greatest proportionate increase in the penetration rate will be in establishments with 10 employees or less, where the penetration rate will increase by 50% from 6% to 9% in the next 12 months. Furthermore, in absolute terms, the greatest increase in the number of new computer users will be in establishments with less than 50 employees where there will be about 4,900 new computer users in the next 12 months as against only 700 new computer users in larger establishments. Table 3 summarises the position. It is very significant that the vast majority (about 87%) of new users will install only microcomputers. About 13% will acquire larger systems.

The survey casts very interesting light on the degree to which various applications are computerised in various sizes of establishments. The most striking feature which the survey highlights is the high degree to which many relatively standard applications are not computerised, even in larger establishments.

For instance, in 45% of establishments with more than 200 employees, where a personnel function is performed, there is no computerised personnel record system (see Table 4). The corresponding figures for smaller establishments is 67% for establishments with 25-99 employees.



Larger machines tend to be used more for payroll, accounting and sales/marketing. Interestingly, graphics and design applications are disproportionately performed on both very large computers and microcomputers. Personnel record applications, on the other hand, are disproportionately performed on small multi-user systems (see Table 5).

On reflection, this application split between different sizes of computer is quite understandable. Budgeting/forecasting, technical/scientific applications and word processing are mainly departmental functions and are thus more likely to be performed on smaller departmental computers such as a microcomputer.

Payroll, accounting and sales/marketing tend to be corporate functions and thus tend to be performed on larger computers. Personnel record applications are somewhat of an exception. While on average they tend, as mentioned above, to be performed on small multi-user computers this does not apply to all sizes of establishments.

In fact, as Table 4 illustrates, computerisation of many applications only takes off to any significant extent in establishments with more than 200 employees. In smaller establishments the degree of computerisation, even of standard applications such as payroll and accounting, is remarkably low, even when one only considers establishments in which these applications are actually performed.

Another interesting feature which the survey highlights is the tendency amongst the user base to perform certain applications disproportionately on certain sizes of machines. Microcomputers are disproportionately used for budgeting/forecasting, technical/scientific, graphics/design applications and word processing.

Table 1: Different degrees of computerisation within engineering establishments.

Very interestingly, on larger sites with more than 200 employees, personnel records applications are disproportionately performed on microcomputers. This may suggest that on certain larger sites the computerisation of personnel records, as far as the central data processing department is concerned, is a low priority, thus obliging the personnel department to seek their own solution through the acquisition of a departmental microcomputer.

The IDC survey also highlights graphics and design as an application area with interesting characteristics. The survey shows that of the 134,000 establishments in the engineering industry only 17% actually perform any kind of graphics or design. Furthermore, only 3% of all establishments have actually computerised these applications to any degree.

Even if one excluded establishments in the construction industry where there is an

abnormally low computerisation of graphics/design that percentage only increases to an average of 7% (see Table 6).

In terms of the types of computers used for graphics and design applications the survey indicates that a microcomputer is used in 70% of cases. In another 7% of cases they are performed on specialised CAD/CAM systems. Only in the remaining 23% of cases are they performed on larger systems (see Table 7).

The survey casts very interesting light on the current relative market share of various computer vendors in the engineering sector of the market. The survey also indicates that there will be substantial shifts in market shares in the next 12 months in the microcomputer area where more and more vendors, including mainframe vendors, are entering the fray.

At the top end of the market in large multi-user systems IBM is

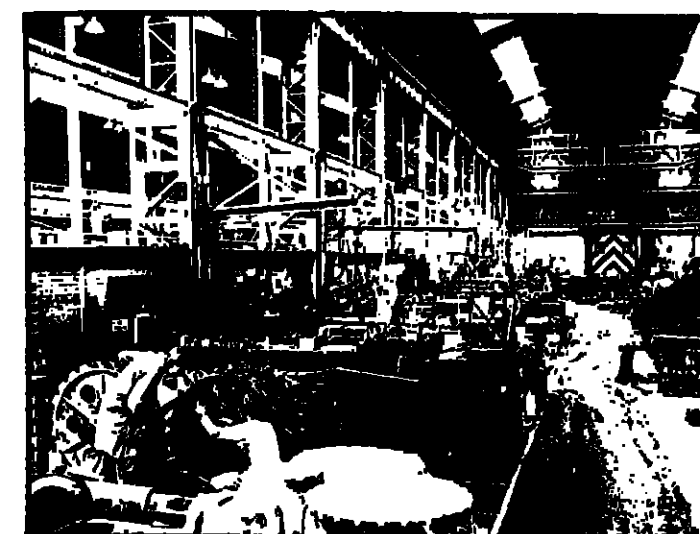
Continued on page 23

Size of establishments	No. of employees	Mid-1983	Mid-1984	very likely possible
1-10	6%	9%	15%	
11-24	11%	19%	27%	
25-49	25%	35%	40%	
50-99	46%	52%	56%	
100-199	70%	76%	77%	
200-499	84%	88%	88%	
500-999	96%	97%	97%	
1,000+	98%	98%	99%	
TOTAL	14%	18%	23%	

Table 2: Computer penetration rates in the UK engineering industries.

Size of establishments	No. of new user sites	Acquiring microcomputers	Acquiring larger systems	TOTAL
1-50	4,700	200	700	
50 plus	250	450		
TOTAL	4,950	650	5,600	

Table 3: Types of computers to be installed in new user sites in the next 12 months.



From page 22

clearly the market leader, with a 63% market share of computers installed. ICL comes second with 24%. Other vendors share the remaining 13% of the market between them (see Table 8).

Further down the market in medium multi-user systems the situation is more open with five vendors sharing three quarters of the market between them, both in terms of installed equipment and also in terms of equipment acquired in the last 12 months. These five are ICL, IBM, Honeywell, Hewlett-Packard and DEC (see Table 9). The survey indicates that the two vendors gaining the most ground in this

area are IBM and DEC with their 4300 and Vax series of computers respectively.

Further down market again in the small multi-computer marketplace the market is even more open with the top five vendors having less than 50% of the installed base between them (see Table 10). The survey suggests that these top five vendors are losing ground to vendors further down the league table.

It is at the very bottom end of the market, in the microcomputer area, where the most dramatic changes in the various vendors' fortunes are occurring. This area has been dominated by three vendors since the launch of the micro in the late 1970s. These are Com-

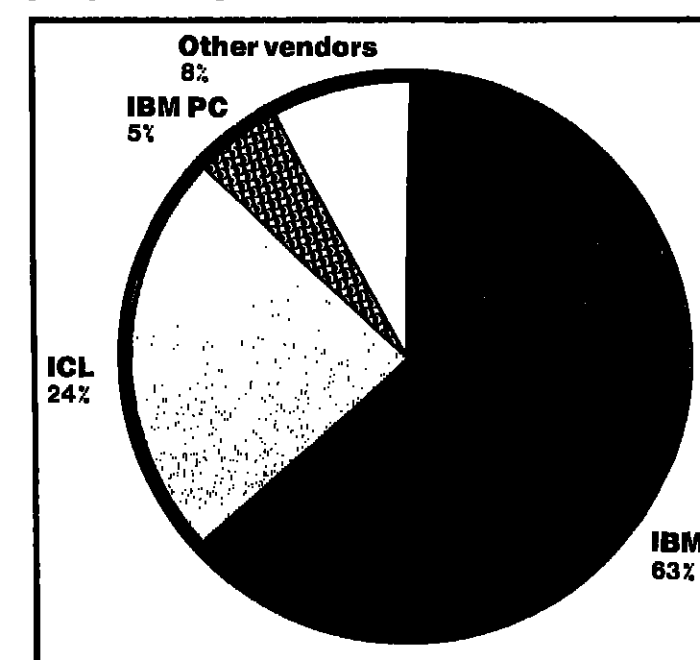


Table 8: Large multi-user systems — vendor market share.

	No. of employees	TOTAL
Payroll	82%	75%
Personnel records	82%	84%
Accounting	89%	84%
Sales/marketing	80%	73%
Budgeting/forecasting	81%	73%
Production/stock control	84%	78%
Technical/scientific	76%	68%
Graphics design	82%	70%

Table 4: Degree of non-computerisation of applications in different sizes of establishments.

	Large multis	Medium multis	Small multis	Micros
Payroll	H	H	L	A
Personnel Records	H	H	L	A
Accounting	A	H	H	L
Sales/marketing	H	H	A	L
Budgeting/forecasting	A	L	L	H
Production/stock control	A	H	H	L
Technical/scientific	A	L	L	H
Graphics/design	H	L	L	H
Text processing	L	L	L	H

Table 5: Applications performed on different types of computers — proportionate degree of use.

Size of establishment	Establishments with a micro	No. of micros	Micro per establishment
1-10	5,300	5,600	1.06
11-49	4,400	5,800	1.32
50-199	2,100	3,900	1.86
200 plus	1,400	6,900	4.93
TOTAL	13,200	22,200	1.68

Table 7: Systems on which graphics and design applications are performed.

# Cautious engineers still wait

modore Business Machines (CBM), Apple and Tandy (see Table 11).

The survey shows that, at least in the engineering sector, there is a change afoot with a significant shift away from the traditional microcomputer vendors towards newcomers to this marketplace. The two vendors gaining the most ground are IBM and ACT.

In terms of market share of microcomputers already installed, IBM and ACT have only some 7% of the market between them. When it comes to planned acquisitions in the next 12 months, more than a third of users in the engineering industries, planning to acquire a microcomputer, indicated that they would be acquiring the product of one of those two vendors — an indication of possible upheavals to come in the microcomputer market.

The whole area of microcomputer usage is one of the most fascinating aspects of the whole survey. The survey indicates that, in total, there are over 22,000 microcomputers installed in the engineering industries in the UK, a figure which indicates that the microcomputer has really now arrived.

Also, interestingly, over 50% of those microcomputers are in establishments with less than 50 employees and almost half of those are in establishments with 10 employees or less (see Table 12). In fact, it is the rapid acquisition of microcomputers at the very bottom end of the market which is giving rise to the rapid increase in computer penetration rate in that area, a feature we have already commented upon.

Another useful way of looking at microcomputers, or for that matter, computers in general, is to see them in relation to the proportion of the workforce most likely to use them. This relationship is similar to the one which economists traditionally use in analysing physical capital investment, say, in the car industry.

The greater the physical capital investment per car worker the greater his productivity should be. In similar vein the greater the mental "muscle power" per office employee, in terms of access to a computer, the more productive he also should be. The survey highlights the ratio between the number of office workers and the number, both of VDUs and of microcomputers, in different sizes of establishments. The results are shown in Table 13.

One of the most significant features which the table highlights is that there are far more VDUs than microcomputers in the user base, particularly in larger establishments where VDUs outnumber microcomputers in the ratio of 10 to 1.

This is understandable given the relatively recent advent of the microcomputer; its relative expense compared to a VDU; its relative weakness, particularly the earlier microcomputers, in a communications environment.

All three points, and in particu-

	Installed base
DEC	17%
IBM	12%
Burroughs	7%
ICL	7%
Data General	6%
Raise/ICL	5%
Other vendors	46%
TOTAL	100%

Table 10: Small multi-user systems — vendor market share.

Size of establishment	Establishments with a micro	No. of micros	Micro per establishment
1-10	5,300	5,600	1.06
11-49	4,400	5,800	1.32
50-199	2,100	3,900	1.86
200 plus	1,400	6,900	4.93
TOTAL	13,200	22,200	1.68

Table 12: Establishments with a microcomputer in the engineering industries.

lar the last, go a long way to explain the dominance of VDUs over microcomputers in sheer number terms in larger establishments.

It also explains why there are actually more office workers per microcomputer in larger establishments than there are in smaller ones. The mental muscle power of office workers in larger establishments is gained more from access to a larger centralised computer via a VDU than it is through a standalone microcomputer.

The distinction between the latest versions of microcomputers and VDUs is, of course, becoming increasingly blurred and it is perhaps useful to treat VDUs and microcomputers as being more or less equivalent. Adopting that approach Table 13 highlights a very interesting but perhaps not too surprising result that, over all, larger establishments in the engineering industries come out best in terms of mental muscle power per office worker.

In fact office workers in establishments employing more than 200 office employees have up to a 3:1 advantage over their colleagues in smaller establishments in terms of computer access.

The main points emerging from the survey are:

- The degree of computerisation within the engineering industry is still comparatively low with 73% of establishments still not having access to a computer.
- There is strong evidence that there is a powerful surge towards computerisation, particularly in small establishments where the penetration rate is expected to increase by 50% in the next 12 months.
- Many of the relatively standard applications are not computerised, even in larger establishments.
- There is a tendency to use microcomputers for the more specific departmental applications and to use larger systems for corporate applications.
- There is strong evidence that there will be significant shifts in vendor market share at the microcomputer end of the market with advancements being made by IBM and ACT.
- The microcomputer is now well established in the engineering industries with over 22,000 of them installed, 25% of which

are in establishments with 10 employees or less.

■ The number of VDUs significantly outnumber the number of microcomputers, particularly in larger establishments.

■ Computer access via VDU or microcomputer is, as yet, still significantly greater in larger establishments than in smaller ones.

Definitions of computer systems used in the survey.

Multiple-user systems:

Large systems. Computer systems

costing over £500,000 which 96 or more users can access at any one time.

Medium systems. Computer systems costing between £50,000 and £500,000 which between 16 and 95 users can access at any one time.

Small systems. Computer systems costing over £50,000 which between two and 15 users can access at any one time.

Single-user systems: Microcomputers costing over £500.

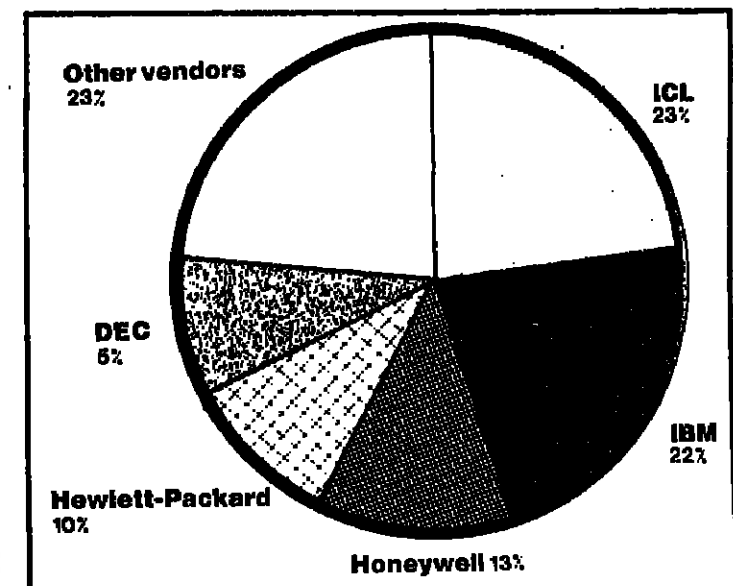


Table 9: Medium multi-user systems — vendor market share.

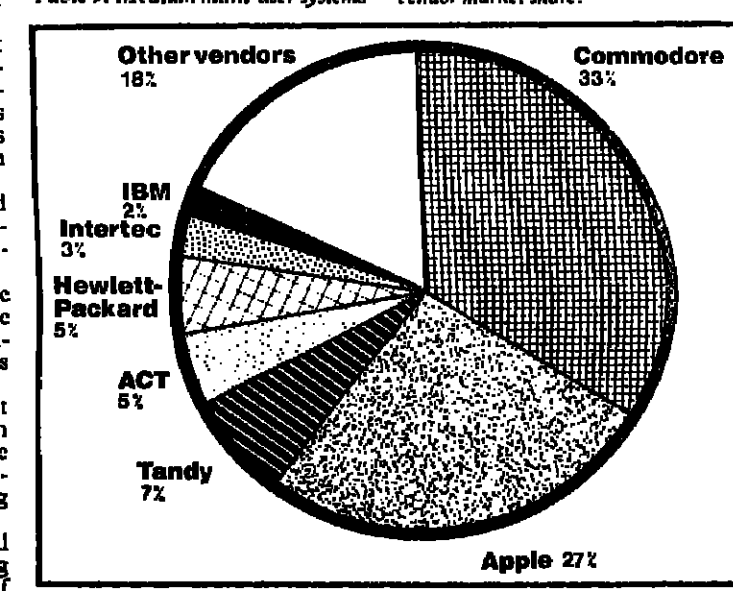


Table 11: Single-user systems, £500-£6,000 — vendor market share.

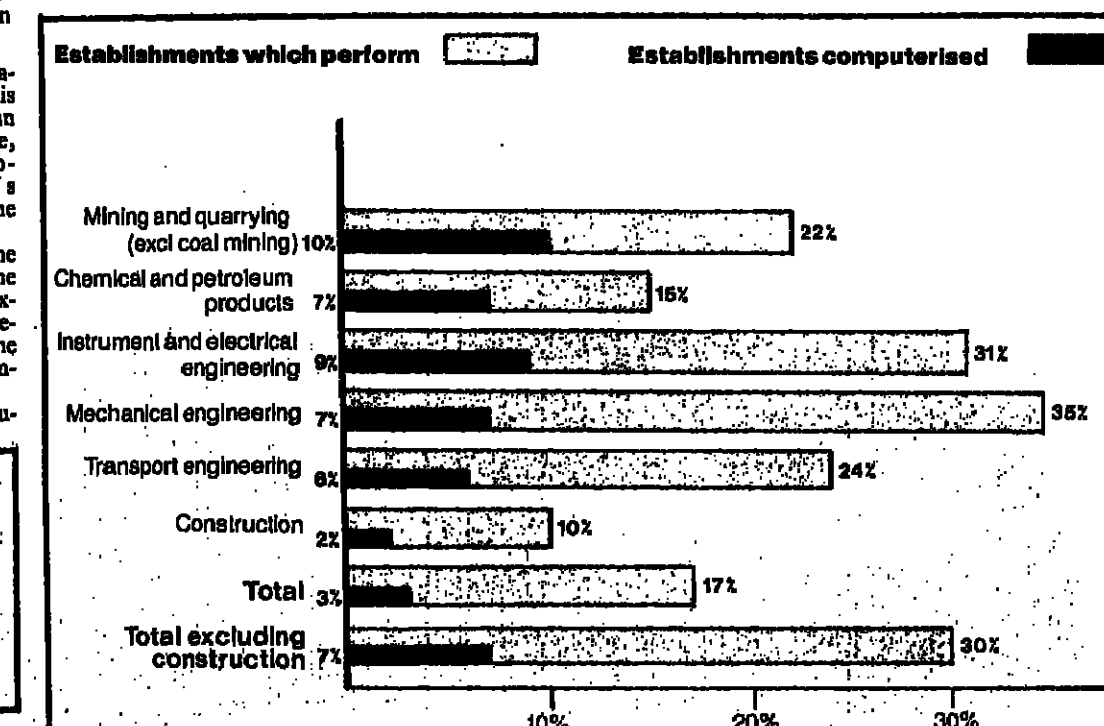


Table 6: Computerisation of graphics and design in the engineering industries.

No. of office workers	Total no. of office workers (000s)	No. of VDUs	No. of micros	Office workers per VDU	Office workers per micro	Office workers per VDU/micro
1-49	618	17,500	14,200	35	44	19
50-199	390	34,100	3,500	11	111	10
200 plus	326	41,000	4,500	8	72	7
TOTAL	1,334	92,600	22,200	14	60	12

Table 13: Office worker per VDU/microcomputer in different sizes of establishments in the engineering industries.



## MEDICAL SYSTEMS

# How doctors can beat the information overload crisis

As a doctor's experience grows, so does the amount of information he must retain and have at his immediate disposal  
Douglas Clarkson looks at how information technology can take the strain off the medical profession

The precise diagnosis of disease from the observation of symptoms requires a vast amount of experience, plus knowledge of previous cases. But although experience is a central information technology has much to offer in ensuring that the vast amount of data available to doctors is used properly.

Doctors are faced with the problem of information overload. There is never really any level of knowledge at which learning ceases. As the years of experience mount, so does the doctor's ability to diagnose clinical conditions more effectively.

It was seen by the pioneers of decision aids in medicine to be desirable to carry over, as effectively as possible to the incoming generation of doctors, the hard-won fruits of a lifetime. Previously, the mechanisms whereby such information was obtained were clinical teaching, text books and the vast breadth of medical literature.

## Pioneers of decision aids found it desirable to carry over the hard-won fruits of a lifetime

Any such process of decision aids must seek, for a given speciality, to express in tangible form, the diagnostic skill of the clinician. This is where the hard work begins and where surprises arise.

Because of the nature of the problem, it makes sense only to examine a specific medical problem in a hospital environment. The development of a computer system for use by general practitioners introduces great difficulties in the adequate quantification of the data on a very broad range of symptoms and conditions. A clinician who becomes involved with decision aids usually works within his or her own particular speciality. Among the forefront of developments so far has been work undertaken at St James University Hospital, Leeds on acute abdominal pain and at the Southern General Hospital, Glasgow on gastrointestinal problems.

With any system, however, the starting point is to choose symptoms of value in diagnosis. It may seem surprising that there should be any uncertainty as to what is, or is not, relevant. Under

close scrutiny, however, long-held assumptions, some of which have been tacked on to the structure of the discipline at various times, can fall by the wayside. Also, other symptoms which were considered of little or no value to the process of effective diagnosis, can be shown to have significant value.

Starting from scratch, therefore, it can be assumed that much basic research is called for and that it is not safe to assume that all in the garden is rose. What in fact requires to be undertaken is a thorough, unbiased audit of diagnostic practices.

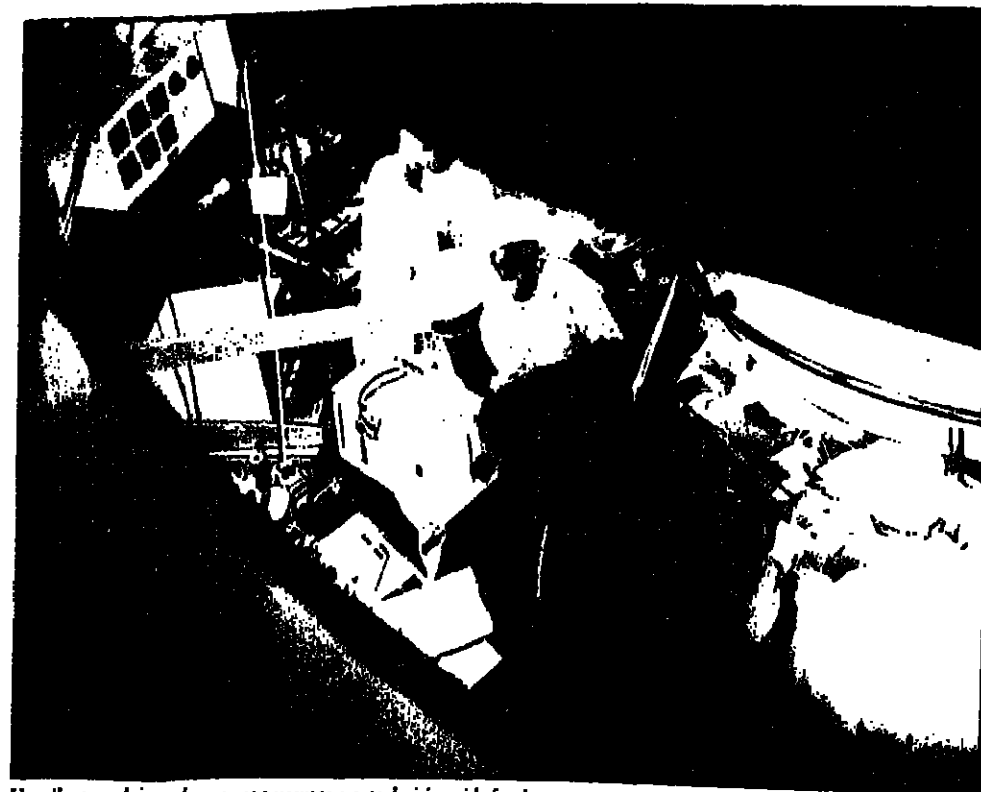
When a final set of symptoms has been selected, it is necessary to set down in unequivocal terms, exactly what is meant by each one. While there is a consensus of opinion as to the meaning of terms like flatulence or nausea, each has to be exactly defined. Such definitions will probably have to be adhered to not just at one site, but possibly at several if a development is being operated at various centres.

After the hard work of elucidation of relevant symptoms and their unambiguous definition comes the stage of relating symptoms to the disease phase. This involves obtaining accurate data on presenting symptoms of patients and the associated accurate diagnoses, confirmed by subsequent investigations. For this to be of any value, data on several thousand cases will usually be required.

Then comes the stage of construction of a statistical model linking symptoms with possible diagnosis, using the existing database of linked symptom-disease information. This stage combines computer and statistical skills, to produce a raw tool for the clinician. Typically, the computer will list a ranking of possibilities from a list of several diagnoses. This listing of the most probable diagnoses may help to clarify the next stage in the diagnostic process.

Further investigations can be then carried out to track down the true nature of the complaint.

The process of building up the information profile is usually ongoing. The initial symptoms for a specific patient are recorded and compared against the extensive store of data on presenting symptoms and proven diagnoses. This generates the initial set of possible diagnoses for the patient. In the timescale of the diagnosis



Excellent work is underway at present to create decision aids for doctors.

tic process it is quite in order to spend several minutes analysing a few thousand cases held on floppy disc. When a positive diagnosis is obtained, this is stored in the patient's entry which then becomes another record that can be used for the collective process of prediction.

## It can only be a matter of time before a free-wheeling operator promotes some home medicine package to diagnose anything from an upset stomach to alcoholic poisoning

Any clinician would be more than hesitant to use such an aid to diagnosis without comparing the computer verdict with final proven diagnosis. This validation phase is of considerable importance and in fact may prove to be one of the few things that is scrutinised extensively in the medical field. After the process of validation usually comes the phase of taking seriously the verdict of the system.

It is always argued that the use of such decision aids is greatly influenced by the process used for

the collection of the initial data and there is at present considerable discussion within the medical world on how the initial patient symptom data should be obtained. Should, for one thing, the doctor always be the intermediary? Are people more honest when communicating with a machine?

Such questions arise out of indications in some quarters that patients may in fact be more honest with computers than doctors. The doctor-patient interview can, if not conducted with skill, fall into the trap of the doctor asking the patient what he wants to hear. Some relevant questions may be missed altogether.

Most questions in decision aid systems are inherently simple involving responses such as "Yes, a lot", or "Hardly at all". These are not questions that need to be

posed by senior medical staff, although they may wish to oversee the process of interview and be able to explain more clearly what is going on. In those instances where functions like heart-rate, blood pressure, temperature and general clinical assessment are required, then the need for medical skill becomes self-evident.

In most references to aids to diagnosis, the computer element is usually to the fore, as if it were some miraculous power of the computer that makes it all possible.

Computers are however, no more than a convenient means of speeding the process of calculation based on well-structured logical processes using data verified by thorough medical procedures.

In the Third World, where ratios of one doctor for 100,000 patients is common, interest is growing in the use of manual look-up tables for various conditions for health workers organised at village level.

The process of developing an aid to diagnosis for a clinical speciality is likely to be a lengthy procedure and the more varied the disease states, then the greater the task will be.

This difficulty is reflected first

in the securing of information on a sufficiently large group of patients and also in the construction of the statistical model required.

The system for diagnosis of acute abdominal pain is currently in use in accident and emergency departments in at least 50 sites in the UK.

While several early systems were developed using PDP11 minicomputers, systems are now implemented on a variety of micro hardware including Pets and Apples.

It is unlikely now that equipment cost will be a serious factor in limiting the further growth of such systems.

Because of the over-riding requirement for large amounts of accurate medical information, it is most unlikely that any external

## With any system, the starting point is to choose symptoms of value in diagnosis

group will threaten the monopoly of the medical profession. The requirement for expert advice on statistical models and computational methods will, however, always be to the fore.

The use of such decision aids will be carefully vetted by those within a particular speciality.

It is not widely appreciated, however, that in terms of computing power, most personal computers with adequate floppy disc store are now able easily to support such applications if the appropriate software and validated database were available to run on them.

It can only be a matter of time before a free-wheeling operator promotes some home medicine package to diagnose everything from an upset stomach to alcoholic poisoning. Knowing, however, the problems that this would cause, a medic would never in his right mind create it.

Even then it would be a grave error to classify it in the same league as the previously outlined types and there is a danger that such superficial developments, if and when they appear, may tarnish the excellent work at present being undertaken.

Douglas Clarkson is a medical physicist specialising in the application of computers to health care.



## FUTURE STRATEGY

Plans have been drawn up for British Rail's DP operations to enter the marketplace . . . . Paul Walton reports

# Is BR ready for the profit line?

THE future of the data processing department is being hammered out at British Rail. For four years, the BR Board has been considering increasing the competition for internal DP work and allowing its Computing Systems and Services (CSS) department to enter the commercial marketplace.

The alternative is to concentrate the considerable in-house computing skills on a multi-million pound grand plan which would exclude all outside competition.

Otto Benz is the director of CSS, and he has the strong conviction that commercialisation has already made his organisation more efficient.

The Board already knows it can count on the government to make the necessary changes to the Transport Act for CSS to sell its services outside BR.

He described the battlelines which have been drawn up: "We are fighting the principle of a planned, Soviet-type system, which incidentally has never been shown to work when applied to a grandiose computing strategy. Against this is the kind of total

now installing so many micros "that DP strategy is now beginning to come from the line managers, who are specifying and using systems from the ground up," adding that this is common in large organisations today.

What is certain is that CSS has secured the supply of these small systems, by having staff on the ground. But the same cannot be said for the next level up, where BR is attempting to fashion an office automation system which draws together all the disparate elements of its administration.

The faction which would have CSS return to the Soviet-style path — and remain a monopoly department — is now trying to get the Board to fork out close on £20 million; Wang has installed word processing systems in the five BR regions; the next step would be to install either the Wang or the ICL distributed systems currently under trial.

Benz hopes to repulse these assaults on the very existence of CSS by offering to take on the competition.

There is plenty to worry about.

## We are fighting the principle of a planned, Soviet-type system, which incidentally has never been shown to work when applied to a grandiose computing strategy

decentralisation and end-user freedom we have gradually been working towards.

"Right now, my own CSS department has to compete for the Board's business in new systems. It means we have lost some contracts to outside firms, but in the long run we become more efficient and the end-user gets more of what he wants.

"The larger suppliers such as IBM or ICL are used to bidding for work within a planned strategy, to win it all-or-nothing. They don't like the extra risk involved in dealing with a decentralised organisation, where everybody knows just what they want," Benz said.

This picture is found in the development of DP in many other large organisations, but it has been nudged along space by the proliferation of micros and the greater demands placed on minis and on the traditional mainframes to increase efficiency directly.

Until 1980 CSS had a monopoly on both the Board's operational and new systems work. When new systems were opened up for competitive tender that year it soon became clear that CSS ought to change as well.

Benz set about improving the basic software skills of his 400-plus programmers from that date, bringing in fourth generation techniques and introducing micros. "This is CSS's major asset, machine-independent programmers who are flexible, and can work with any system or application."

The ubiquitous micro has loosened CSS's need for large processors. In 1981, its five regional DP centres were charged with the task of opening "shops" which would sell micros to internal customers, who were already beginning to buy their own of petty cash.

Benz described how his staff are

The swelling sales of micros and the office system all detract from his £20 million yearly budget, putting several mainframes and the staff who operate them in jeopardy. He has seen over a million pounds worth of business go to outside competition.

"A significant amount of work has gone to ICL at British Rail Engineering, which is also taking its own machine on. Hoskyns is supplying the new Sealink accounting system. The BR Property Board has bought a CMC mini system, directly replacing one of our mainframes. Price Waterhouse won one of the most prestigious systems in the BR budget, worth £50,000," Benz said.

"On the one hand I am welcoming competition as something which CSS ought to be allowed more of."

Benz is far from being a radical. He is arguing that cheap and efficient DP will follow if CSS is allowed to sell its excess skills to the outside world.

The creation of CSS as a commercial division of BR might herald a unique split of responsibilities: with systems development not entirely under its control; giving it the freedom to compete with the external competition than the other way around.

Benz said that the end-user is free to choose which computer system he or she wants; there is the belief within BR that in order to cut costs, now running at some £3 million a day, it is essential to give line managers responsibility for what they spend.

"While this might spell anarchy for standards and strategies, it does work: people always manage to get a system to work if they bought it, rather than had it thrust upon them," he said.

But at the end of the day, what contribution to cutting costs can CSS make? Compared to the



# MARKET PLACE

## FOR SALE

Offers are invited for a 120/160 KW Emerson UPS System Type AP704S/66S together with 180 Chloride SMIM-215A Gaunlett Tubular Cells presently installed at LOLA, Tower Point North, Sydney Road, Enfield EN2 6UE. Tel: 01-366 6611 for permission to view.

Offers to be submitted to the Director of Computer Services not later than Wednesday, 26th January, 1984.

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## DEC FOR SALE — FOR RENT — WANTED

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SYSTEMS	11/23	11/23-BF	SX RXMMA-EN	DX RXMMA-CN	DX RXMMA-BN
11/23	SV-11730-2A	SV CXMMA-CN	SV CXWMA-CN	VAX 11/730	VAX 11/750
OPTIONS					
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11/23-BF	DLV11-J	FP11-F	LA100-YB	MSV11-LF	VT100-AB
11/24-AB	DLV11-JA	FP730	LA100-ZD	MSV11-PL	VT101-AB
11/44-CB	DLV11-JP	FP760	LA100-EL	MSV11-PL	VT102-AB
11/23-BL	DLV11-KA	FP760-AB	LA100-EL	MSV11-A2	VT103
11/24-BD	DMF32-AA	H780-J	LA120-GA	MAV11-AC	VT125-AB
BA11-KF	DR11-C	H0812	LA120-DA	MAV11-AA	VT131-AB
BA11-KX	DR11-E	H0812-AB	LA120-DA	MAV11-AA	VT131-AB
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BA11-MF	DRV11-J	KD11-HA	LA120-DA	MAV11-AA	VT131-AB
BA11-SB	DT07-CD	KD11-HA	LA120-DA	MAV11-AA	VT131-AB
BC03M-29	DT07-BS	KD11-BE	LA120-DA	MAV11-AA	VT131-AB
BC06-R	DZ11-A	KD11-BP	LA120-DA	MAV11-AA	VT131-AB
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DD11-AE	DZ11-E	KD11-BP	LA120-DA	MAV11-AA	VT131-AB
DL11-E	DZ11-F	KD11-BP	LA120-DA	MAV11-AA	VT131-AB
DLV11-E	DZV11-C	KD11-BP	LA120-DA	MAV11-AA	VT131-AB

## This month Computer Choice tells you which computers under £200 deserve a place under the tree.

Now there's an easy way to make sure you choose the right computer this Christmas.

The second issue includes a Buyer's Guide with all the facts on micros under £200 and the software that goes with them with a special look at the Commodore 64. Plus our triple test of the Electron, Dragon and Colour Genie.

There's also a VIC 20 software guide and we ask whether video games or computers are the best value.

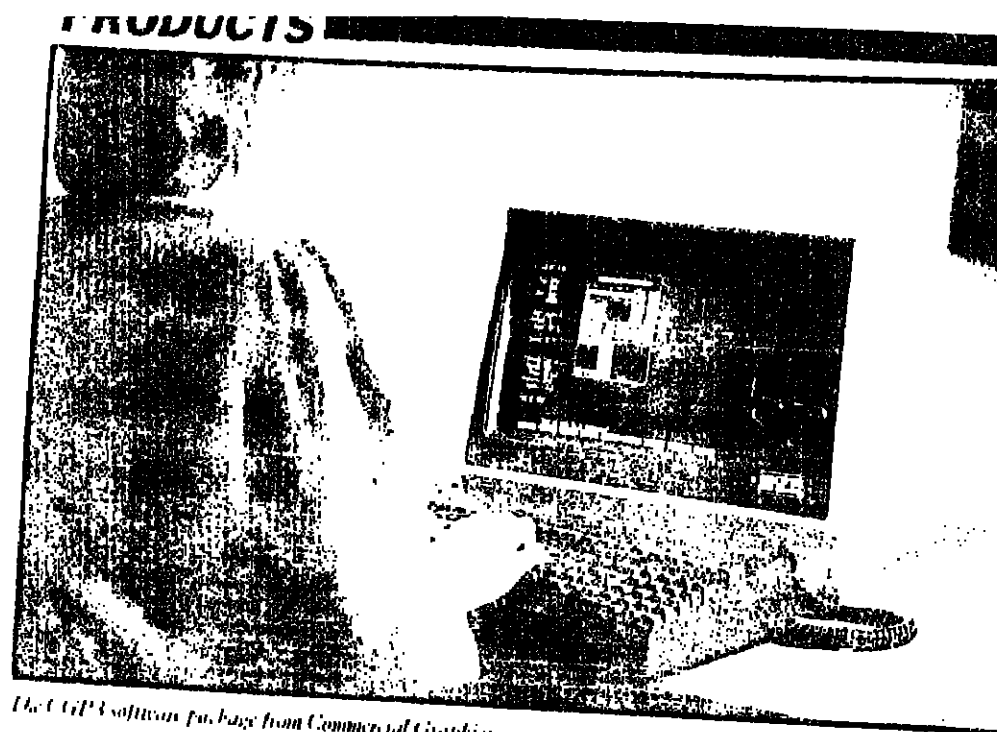
And lots more to make choosing a home computer easy and owning one fun. All in January's Computer Choice, out now 60p.

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1001 no 1210





The CIP software package from Commercial Graphics.

## Three in one graphics software package

COMMERCIAL Graphics has released a new software package called CIP3 which is made up of three integrated processes.

Up till now, text entry, hyphenation and justification and page make-up have been separate

processes and in most cases required separate peripherals. CIP3 is all three processes combined in a microcomputer which is off-the-shelf.

Just like any other micro it can be used for business purposes

when the CIP3 software is not resident in the hardware.

Commercial Graphics (CW), The Uplands, 145 Manor Road, Littleover, Derby DE3 6BU. Tel: (0332) 372841.

## Brochure on cable form service

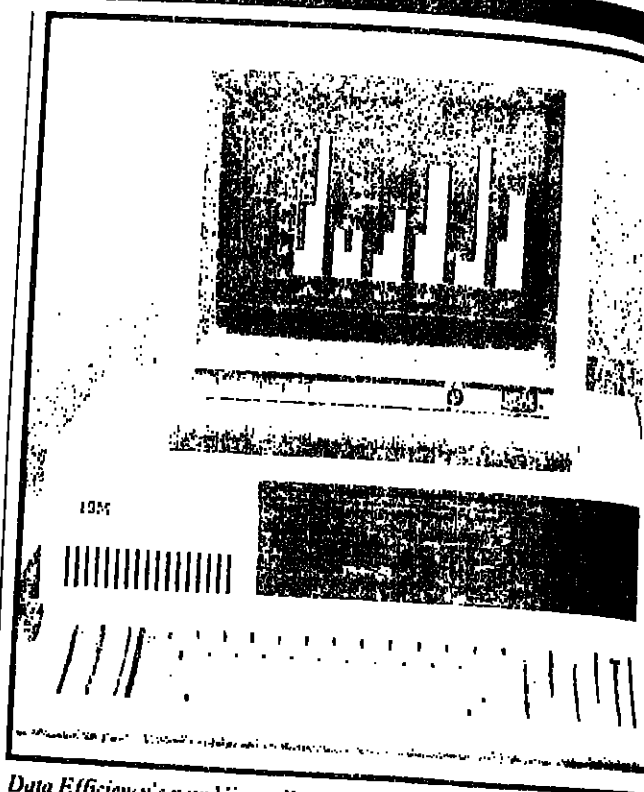
THE cable-form service of H & T Components, Wiltshire's leading connector manufacturer, is laid out in a new brochure.

The service provides top quality plug compatible cable-forms, guaranteed fully tested by H & T Components.

Utilisation of the connector manufacturers' professional service and considerable experience to provide cable-forms ensures highest quality whilst maintaining cost-effectiveness.

H & T Components cable-form service offers a range of benefits to the customer including no-tooling costs, reduced parts inventory, use of approved cables, standard, single or double ended jumper, complete with a professional engineering support unit.

H & T Components (CW), Dunbeath Road, Swindon, Wiltshire SN2 6EA. Tel: (0793) 693681.



Data Efficiency's new Vision-PC colour video.

## Kaga/Taxan monitor complements IBM-PC

PRODUCED to complement the IBM PC, the new Kaga/Taxan Vision-PC is a high-resolution 12 inch monitor, capable of displaying 2,000 characters. Suitable for computer graphics, due to its faithful reproduction of intermediate colours, the new Vision-PC from Kaga costs £399, exclusive VAT.



The Eprom range from GP Industrial Electronics.

## Programming and emulation with Eprom

A RANGE of Eprom programming and emulation equipment, designed to cater for production and development requirements of engineers involved in microsystem design has been launched by GP Industrial Electronics.

The range centres around three basic Eprom programming and emulation units: the EP-8000, EP-4000 and the P-8000. Top of the range is the EP-8000, a unit specifically designed to emulate/program all popular NMOS Eproms without any of the personality cards or other expensive extras normally required by other similar equipment. All the necessary software is included, and the machine automatically configures itself for programming or emulating the selected devices.

The EP-8000 also features an enhanced video output, which allows the user to view the contents of any block of memory. Data is loaded into the 8K x 8 static RAM from a pre-programmed Eprom, the EP-8000 keypad, the serial or parallel port or an audio cassette.

GP Industrial Electronics (CW) Unit E, Huxley Close, Newham Industrial Estate, Plymouth PL7 4JN. Tel: (0753) 332961.

## Lloyd's brokers get market

A FULLY integrated Lloyd's brokerage product designed to utilise the power and capability of 32-bit superminis has been announced by Perkin-Elmer Data Systems.

Called Market, the system will handle all text processing, risk and claims processing and ledger accounting requirements under Lloyd's rules, yet retain sufficient flexibility to cope with the many varied procedures followed by individual Lloyd's brokers.

A key advantage of the system is its modularity, allowing brokers the option of implementing one or more modules at a time as resources allow, without restricting its eventual integration. This integration means that virtually all information is entered only once, reducing effort and the chances of error. Comprehensive validation routines and full audit trails provide further controls on the integrity of data. The new product has already been the subject of several pre-release orders, the company says.

Perkin-Elmer Data Systems, 227 Bath Road, Slough, Berks SL1 4AX. Tel: (0753) 34511.

## PRODUCTS

## Run CP/M on any computer

DATA General users can now run the CP/M microcomputer operating system on any computer from the Nova 1200 to the MV10000.

The new Mirage 15-inch board from Sintrom Ellinor takes its power from the host computer and can use all standard peripherals, such as discs, printers and terminals.

Sintrom Ellinor points out that this opens up the library of 3,000-plus applications programs written under CP/M to Data General users.

The Mirage board has two Z80A-based microcomputers, both with 64K of memory. It supports two users, but because the additional load on the Data General computer is minimal the number of Mirage terminals can be expanded to 64.

An auxiliary serial port is provided for links between the Mirage and another microcomputer or with a printer.

Programs can be loaded from an external microcomputer or bought from Sintrom Ellinor on Data

General media. The programs are stored on a Data General hard disc in "virtual floppy disc" format. This is a standard file which can be backed up, copied or dumped under Data General's RDOS and AOS operating systems in the same way as other files.

Other software supplied includes a diagnostics routine and a server, which runs under the Data General operating system. The server can be implemented while the computer is running, without the need to bring the system down.

The Mirage is supplied with a CP/M manual and a copy of the licence from CP/M owner Digital Research.

Installation takes less than an hour. The board is plugged into the next available slot and two terminals are reconnected to the cabling panel. The terminals can consequently be switched from microcomputer to microcomputer operation through the keyboard.

Sintrom Ellinor (CW), 14 Arkwright Road, Reading RG2 0LS. Tel: (0734) 875464.



The Orb with hard disc units

## Store hard discs for Orb

ORB, the 16-bit multi-user micro from ABS Computers, is now available with hard disc storage. The extra disc space is available either in the form of integral or external disc units, which have been designed to fit in with ORB's design and colour scheme.

A 10 Mbyte internal disc drive can now be incorporated. ABS Computers (CW), Portlisle, Brighton, Sussex. Tel: (0273) 421509.

## Rapid brings in graphics display station

AN advanced 19-inch graphics display station, the Envision 239, has been launched in the UK by Rapid Terminals.

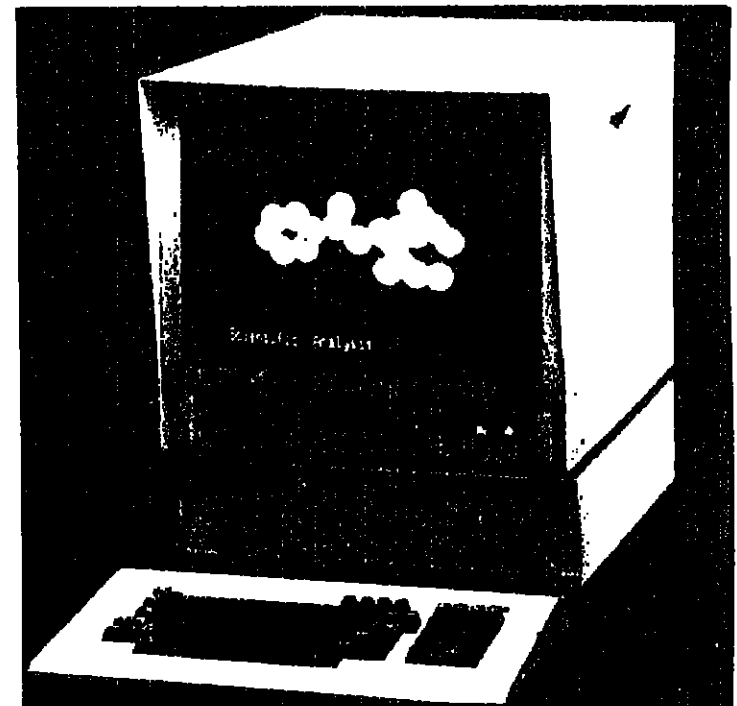
Envision is an American company, exclusively represented by Rapid Terminals in the UK.

The Envision 239 has local graphics processing capabilities and high resolution colour display. It is intended for use in table-top or rack-mount configurations for CAD/CAM, engineering and process applications.

Features include 640x480 pixel resolution, local display list processing, 4,096 colour palette from which 16 colours can be displayed simultaneously, user definable symbols and hardware zoom and pan.

The display is compatible with the DEC VT100 and the Tektronix 4105, and is supported by graphics software packages from Precision Visuals Inc, ISSCO, Megatek and SAS Institute.

The display list architecture of the 239 allows graphics such as vectors, polygons and graphics



The Envision 239 graphics display station.

characters to be stored locally in the terminal, allowing the machine to perform graphic object modifications, transformations and redrawing, which a host computer would ordinarily have to do. Up to 6,000 graphics objects can be stored and manipulated locally, expandable to 38,000 objects. For sophisticated design applications, the 239 allows graphic objects to be grouped into segments. Rapid Terminals (CW), Rapid House, Denmark Street, High Wycombe, Bucks HP11 2ER. Tel: (0494) 26271.



SUM-LC/25 runs on the IBM-PC.

## CAD on IBM-PC

R & H SYSTEMS is launching the SUM-LC/25, a low cost, 2-D computer aided design system designed to run on the IBM Personal Computer. It has been developed for use in electrical, civil and mechanical engineering drawing offices, architectural practices and educational establishments where there is a need to produce accurate drawings in a wide range of scales.

The system is supplied complete with a comprehensive software package, IBM-PC with 64 Kbytes of memory, two 5 1/4 inch disc drives, colour monitor, a 12in VDU, design tablet and plotter.

With the SUM-LC/25 it is possible to create drawings in colour on the computer screen using a digitiser tablet, joystick or keyboard. Corrections and revisions are made quickly and easily.

New drawings may be assembled from previous drawings if required and the finished drawing may be plotted to any scale. The SUM-LC/25 is a powerful draughting tool that is easy to use, but also has comprehensive capabilities for the experienced designer. Clear and concise instructions guide the user through the steps necessary to make a drawing. The system can draw all line types, arcs, circles, rectangles, ellipses, regular polygons, Bezier curves, fillets and welds.

It is possible to change any part of the drawing on the screen. Individual objects or extra groups may be moved, copied, rotated, scaled, imaged or deleted. The user can zoom in on any part of the drawing for detail work.

The cost of the system is £12,450. R & H Systems (CW), Oxford House, Oxford Street, Wellingborough, Northamptonshire NN8 4HG. Tel: (0933) 227477.

## Choose the best portable

A CONSULTANCY specialising in the use of portable terminals has been formed to take advantage of a market expected to grow 50% a year from the mid-80s onwards.

Nydus Consultants says it will help cut the "often lengthy and traumatic evaluation period" that is important for the success of any project. It can also see projects through to the end if required.

Its services cover feasibility studies, requirement specifications, equipment and software selection, system design, market research and training. It expects to expand to take on software development.

Nydus says it is in close contact with all portable terminal manufacturers, monitoring the market and evaluating latest products, including radio and infra-red transmission devices.

The company points out that prospective users have over 100 portable terminals and computers to choose from.

Nydus Consultants (CW), Victoria House, 411a London Road, Camberley, Surrey GU15 3HZ. Tel: (0276) 681027.



Cunard International Hotel, London  
January 31 - February 2, 1984  
10.00 - 17.30 (closing 16.00 on the last day)



## Especially for the computer professional

Peripherals '84 is the central event in the computer peripherals industry's calendar, because it offers the specialist visitor like you, an opportunity to see the very latest equipment on offer from the manufacturers. Only at a show dedicated to peripheral equipment including terminals, printers, disk drives and plotters, could you see the wide range of cost effective equipment available today to the professional computer buyer.

The show's professionalism is guaranteed by the joint sponsorship of the industry's

own trade magazine, Systems International, and the Peripherals Suppliers Association. A simultaneous programme of seminars is held by the Peripherals Suppliers Association in recognition of the central place this prestigious exhibition holds in the peripheral industry. For full information of the seminar programme telephone Mrs Helen Gibbons on 0763 71209.

Both the show and the seminars are held at the Cunard International Hotel, Harpersmill, itself close to the centre of

London and within easy reach of Heathrow Airport. Peripherals '84 is organised by Reed Exhibitions which also stages other major computer related exhibitions including Compex, Software and The Computer Trade Show.

So if you're looking at the peripheral market make sure you visit Peripherals '84 and discuss your needs with specialist suppliers. It's the central event for peripherals.



## "Where the professionals meet"

Wembley Conference Centre March 13-15  
Open 09.30-17.00 daily

If you want to talk to buyers then The Computer Trade Show '84 is the certain way of reaching an audience of the highest quality. Only bona fide trade visitors are admitted to the show and at the last exhibition 3,653 trade buyers came to The Computer Trade Show. Such people are serious business buyers, with 41 per cent of 1983 visitors involved in computer equipment for systems integration and 25 per cent looking for OEM.

This impressive audience attends The Computer Trade Show because of the guaranteed quality of the show. Held near the centre of London at the modern Wembley Conference Centre with its sophisticated businesslike atmosphere, it is staged by the country's largest exhibition organiser, Reed Exhibitions. Sponsors of the show are Computer Weekly, Systems International, Practical Computing and Micro Business.

A prestigious conference programme held in conjunction with the show is certain to attract wide media coverage and issues discussed in depth, the conference will be the talking point of the year in the trade. For further information contact Christine Jones, Tel: 01-643 8040.

Reed Exhibitions has organised an impressive promotional programme for The Computer Trade Show '84 with direct mailings to selected visitors to the COMPEC series of exhibitions. Editorial previews of the exhibition in the sponsoring magazines ensure that interest in the show is at its height in the crucial period just prior to The Computer Trade Show '84.

With this kind of backing it is no wonder that an important number of computer companies, like Digital Equipment Company, Perkin Elmer, Kode, Norsk Data, General Automation, Rediffusion, Geveke, Newbury Data and Multicomputer, have already booked stand and space at the show. So if you want to be sure of meeting thousands of business buyers with bulk stand space at The Computer Trade Show '84, by clipping the coupon below, or better still phone Gillian Johnson on 01-661 3129 NOW!

I am interested in exhibiting at The Computer Trade Show '84. Please send me a copy of the show brochure. I am interested in visiting. Please send me a visitor registration leaflet.

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Return coupon to: Gillian Johnson, Exhibition Sales Department, Reed Exhibitions, 100 Broad Street, London EC2M 1JH. Tel: 01-661 3129.





## 'Major change' in concept of comms network

ANYTIME representing a major change in the concept of the communications network? Comms Products, a modular data communications system, Network Products. It offers a set of building blocks which enable the user to create a versatile data communications network. The user can expand the network and also change it completely according to future requirements. It is simply a matter of changing modules.

The hardware modules chosen determine what the system is: number of ports, type of ports, size and network structure. The software modules control what the system does: protocols, capabilities and network connection. By combining the appropriate set of hardware and software modules the user can tailor the system to his needs, says Network Products.

The modules are contained within chassis, sizes of which vary from compact desk-top models to larger rack-mounted versions. Each hardware module contains its own 16-bit microprocessor and

random access memory so that every module added implies an increase in the system's processing speed and storage capabilities.

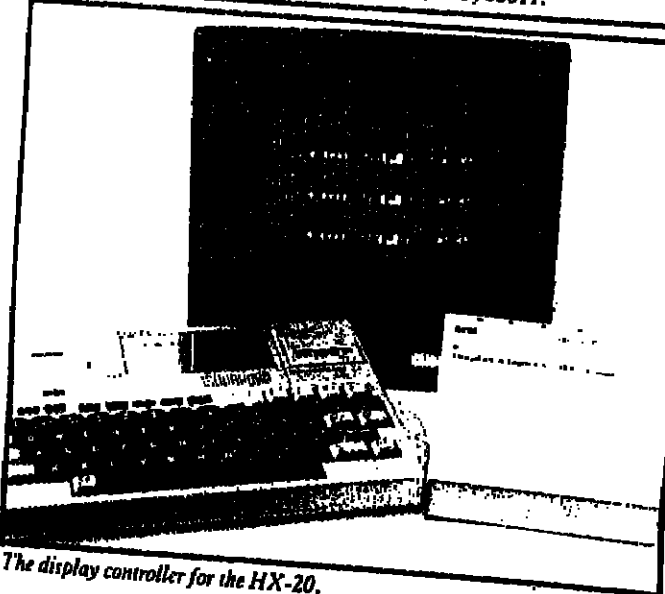
Modules communicate on a high speed 16-bit bus at up to 48 megabits per second while an inter-chassis bus allows communication between chassis at up to 80 megabits per second.

Since each hardware module is independent, in the event of failure only the lines on one card would be lost. In addition, built-in diagnostic checks make it possible to isolate problems to specific modules quickly.

If a failure occurs, modules can be removed when the system is up and running.

By allowing the user to tailor his system to any application as and when required, Comms Products offers a cost-effective data communications network, says Network Products.

Network Products (CW), Patricia House, Church Lane, Thatcham, nr Newbury, Berkshire. Tel: (0635) 66011.



The display controller for the HX-20.

## Colour controller

THE HX-20 display controller for the Epson HX-20 portable computer, now available, is made in England by Oval Automation.

It enables the HX-20 to be interfaced to a television or video monitor, permitting the display of 512 alphanumeric characters or over 8,000 colour pixels. It is the only colour display controller approved by Epson for use with the HX-20.

In the alphanumeric mode the HX-20 displays 16 lines of 32 characters, in green or orange. The full upper and lower case character set is the UK version, with the pound graphics and symbols generated by using the graphics key on the HX-20 are also available. The unit responds to all the cursor motion keys, with automatic scrolling where required.

In colour graphics mode, the HX-20 displays 128 by 64 colour four colours, with two colour sets available. The two sets cannot be interlocked on the display.

A monochrome graphics mode is also available, offering improved resolution of 128 by 96 pixels, in either green or black and white.

Connections are by a DIN plug and two outputs are provided for connection to the TV aerial socket or direct video connection, if available.

Oval Automation (CW), Courtwick Lane, Littlehampton, Sussex BN17 7PA. Tel: (09064) 25225.

## Shop floor terminals

TWO new terminals from Digital Equipment Co. are purpose-designed to withstand the rigours of shop floor use. Tasks include job tracking, production reporting, stock movement and employee record keeping.

The RT490, says DEC, provides a general data collection facility for all levels of production personnel who, aided by a step-by-step user display guide, can easily key-in complete and unambiguous data. It is also suited for such interactive transactions as stock level enquiries and job priority instructions.

Features of the RT490 include a 40-character display, a full alphanumeric keyboard, and a built-in

document reader for bar-coded IO cards, job tickets and other forms of shop-floor records and reports.

Frequently-used applications are resident in the terminal.

The complementary RT496 records all employee movements using a simple two-key-in and Out code reader for employee identification. Rapid data access makes it suitable for use as part of a general purpose data collection system.

Both terminals are compatible with industrial terminals already available from DEC.

Digital Equipment Co. Digital Park, PO Box 110, Reading RG2 0TR. Telephone (0734) 868711.

## Connection to the Pet

MATOR Systems has added a new unit to its Dolphin 3 range of protocol converter systems. The Pet micro will enable users to link using 3780 and 2780 protocols.

Priced at under £1,000, the new Dolphin 3 provides a simple plug-in IEEE 488 connection to the Pet.

Mator Systems (CW), 134-140 Church Road, Hove, Sussex. Tel: (0273) 728451/2.

Digital Equipment Co. Digital Park, PO Box 110, Reading RG2 0TR. Telephone (0734) 868711.

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## Micro-based CNC lathe is targeted at colleges

COLNE Robotics Company has extended its product range with a computer numerically controlled educational machine tool.

The Colne 5 CNC Lathe, an all-British development, is the first of a planned range of advanced educational CNC machine tools designed to run from most eight-bit microcomputers.

The Colne 5 is within the scope of the new Department of Industry grant - the pound-for-pound aid to colleges of further education buying CNC machine tools.

The lathe, complete with tools, accessories, and handbooks will cost £1,889.

The Colne 5 is supplied with a comprehensive handbook and a

separate operator's guide and exercise manual. The system weighs 40kg and incorporates a number of safety features including a lockable safety cut-out button, positioned prominently on the front control panel, to disable the DC motor; a transparent guard which covers all moving parts when the motors are running; a safety switch enabling the motor to be cut-off as the guard is raised; a similar interlock which protects the end cover plate; and microswitches to prevent the saddle overrunning the bed.

John Reekie, chairman of Colne Robotics, who set up the company in May 1981, said: "We feel the price is realistic and affordable,

and meets the requirements of those colleges of further education which wish to teach young engineers the skills needed to gain the maximum benefit from the new technology embraced in computer numerically controlled machine tools."

Colne Robotics, which has already established itself in the teaching robotic products market, is backed by Prutech, the high technology venture capital arm of Prudential Assurance.

Prutech has so far invested £250,000 in the company.

Colne Robotics Co (CW), Beaufort Road, East Twickenham, Middlesex TW1 2PQ.

## Local area network ring link-up

A CLEARWAY Gateway node which allows users to link up two Clearway local area network rings is now available from the designers of Clearway, Real Time Developments.

Designed to meet the needs of a Gateway user wishing to connect one Clearway network with another in a different building, the Gateway node links at 96 baud via a standard telephone line.

Two Gateway nodes are used, one on either ring, with each effectively assuming the number range of the standard Clearway nodes in the other network.

The Gateway nodes are available from Real Time Developments at £300 per unit. They join the Clearway Model B and Clearway Model A nodes as the latest standard Clearway networking equipment first introduced by RTD at Computex '81.

Real Time Developments (CW), Lynchford House, Lynchford Lane, Farnborough, Hampshire GU14 6JA. Telephone (0252) 546213.

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## Handwritten input and fewer errors with Telepad

A NEWLY-FORMED British company has entered the data capture field with the Telepad.

Almost all data input for computers or communications systems is as hand-printed documents. In data can now be captured directly by writing to almost any computer system with Telepad from BCI Computers (GB).

The Telepad is a small unit available as a standalone mini-terminal which runs CP/M. The unit consists of a pad 13x11 screen of 40 characters and an electronic pen, and recognises alphanumeric and many special characters.

A user-oriented terminal which eliminates keyboard problems and the data preparation cycle, the Telepad speeds up input and reduces errors says RCU. It allows direct handwritten input to systems from any work area - an office desk, factory floor, store and the shop counter. Applications include telexes, point-of-sale word processing, data collection, telex input, general accounts and stores records in all types of business and industry.

The Telepad allows for random input, graphics, validation and visual verification. It is Teletype compatible and a V25 and RS232 interface is provided as standard.

The pen used with the Telepad is removable and helps to obtain the concern of security-minded management. The low frequency signal between the pen and pad can penetrate through an inch of paper, or even a table top.

It is available for under £2,000. BCI Computers (GB) (CW), 217-219 High Street, Orpington, Kent BR6 0NZ.

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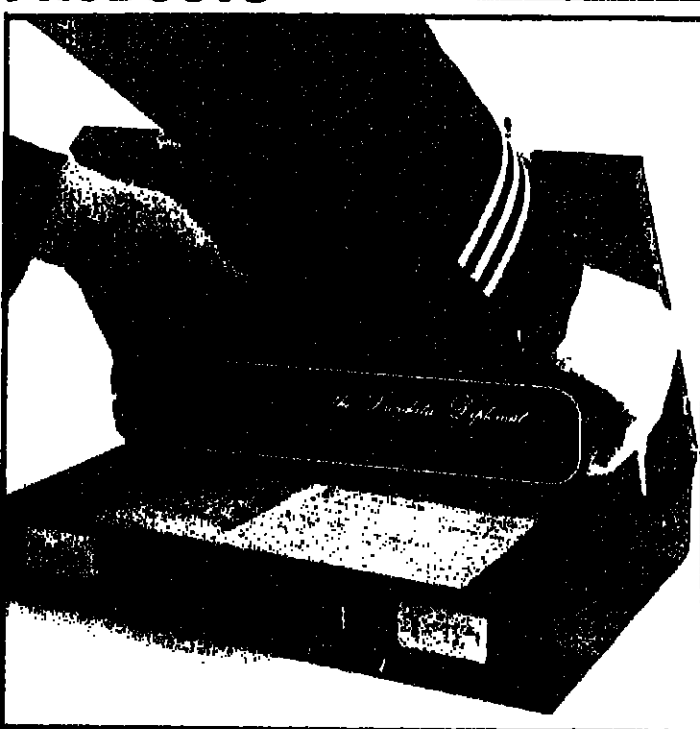
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The latest additions to the range are the Model HV1 protocol converters, which enable terminals or computers using asynchronous protocols to connect to Honeywell mainframes operating the VIP 77xx synchronous protocol.

Remote and direct connections to the host are supported at data rates up to 19.2K bps as determined by the host.

Asynchronous data rates may be selected from the standard range 50 to 19.2K bps.

Single channel models are available which support connections of a single asynchronous terminal or computer, as well as the economical multi-channel models which can support a cluster of from two to four low-cost terminals.

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## Advanced graphics display system

GRESHAM Lion (PPL) has announced a new ultra high resolution colour raster scan display system designated the Supervisor 1024.

It will have considerable appeal for users requiring the production of complex mimic diagrams, interactive CAD/CAM displays and high resolution imaging, says Gresham Lion.

Designed and manufactured in the UK, Supervisor 1024 fully utilises the capacity of the latest generation high resolution CRTs to provide a display format of 1024 x 768 pixels.

It also has 50Hz non-interfaced with a physical picture area of up to 2048 x 2048 pixels.

A display which is claimed free from flicking has been achieved without the use of long persistence phosphors.

Gresham Lion (PPL) (CW), Lower Way, Thatcham, Berks.

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The Dilog Winchester controller.

## 216 Mbytes storage on extended range

THE Distributed Logic Corporation (Dilog) of California has now extended its range of 5 1/4 in Winchester controllers to enable up to 216 Mbytes of online mass storage to be available on a single DEC LSI 11 microcomputer. Until recently 40 Mbytes was the maximum available.

The new product, the DQ615, is claimed as the first controller able to support two Maxtor XT-1000 Winchester disc drives, each having 112 Mbyte capacity. The combination reduces the cost of mass storage on a DEC mini which brings the management of large files within the economic reach of the smallest companies.

The breakthrough has been achieved by using an RK06/07 emulation with a standard ST506/ST412.

The DQ615 controller also incorporates Dilog's Universal Formatting technique, which allows any two disc drives compatible with an ST506 interface to be controlled, even if of different capacity and configuration.

The DQ615 is software transparent to DEC's RG-11, RSX11M, RSTS and Bell Laboratories' Unix operating systems.

Dilog International (CW), 12 Temple Square, Aylesbury, Bucks HP20 2QL. Tel: (0296) 34319.



Calcomp's new graphic development system.

## Calcomp makes some graphic developments

THE next stage of Calcomp's drive into the raster scan graphics display market comes with the announcement of the graphic development system, GDS 4000.

Calcomp says the GDS 4000 is designed to enable OEMs and system designers to develop cost-effectively distributed graphics applications software for systems utilizing Calcomp Vistagraphics 4000 raster scan displays.

A standalone graphic computer, GDS 4000 includes a high resolution raster scan colour graphics display, fixed/rewritable disc storage, a real time multi-tasking operating system and a complete set of software tools such as editor, micro assembler, compilers, utilities and support routines.

The Vistagraphics 4000 Series on dual Motorola MC68000 16-bit microprocessors and incorporate a double display buffer which provides real time dynamic graphics by eliminating screen blanking during image updating.

Other key features include a choice of display resolutions up to 1024x1024, up to one megabyte of RAM, up to 20 megabytes of disc storage and up to eight planes of display memory with a look-up table, providing as many as 256 simultaneously displayable colours from a palette of 4096 colours.

Most models in the range use non-interlaced display for flicker-free images and a selection of host interfaces and I/O devices, such as trackballs, joysticks, digitiser tablets etc. is also available.

The Vistagraphics system can operate both as a standalone unit or as part of a fully distributed graphic system.

Calcomp (CW), Carr House, The Ring, Bracknell, Berkshire RG12 1ER. Tel: (0344) 50211.

## High-speed modem family

A FAMILY of new generation modems utilising the latest state of the art technology has been introduced by Paradyne.

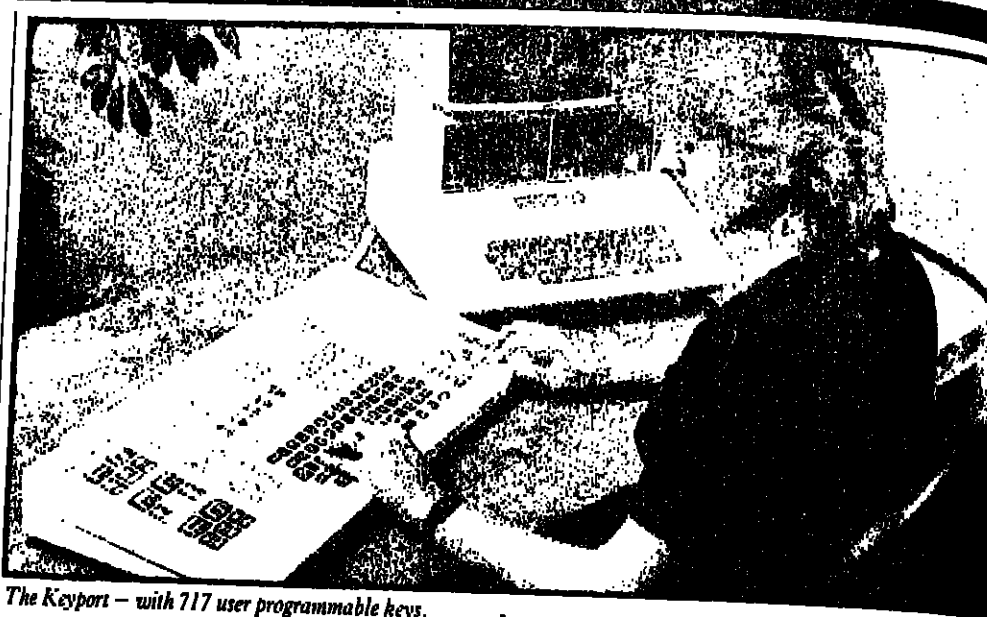
The family comprises the MPX2400, the MPX4800 and the MPX9600.

The MPX2400 is a high-speed 2400 bps synchronous modem for use in point-to-point or multipoint applications over unconditioned four-wire leased circuits. The modem is CCITT V26 compliant and has a full back rate of 1200 bps.

The MPX4800 operates at 4800 bps synchronously and is designed for use in point-to-point or multipoint applications over unconditioned four-wire leased circuits.

The top-of-the-line MPX9600 operates at 9600 bps synchronously, and is CCITT V29 compliant when operating point-to-point configurations. It is also strap selectable for "rapid poll" operation. This permits operation in a multipoint configuration with a RTS/CTS delay of 20 ms.

Paradyne (UK) (CW), Paradyne House, William Street, Windsor, Berks. Tel: Windsor 56712.



The Keyport - with 717 user programmable keys.

## 717 user programmable keys

GCS Communications claims that its Keyport 717 eliminates many of the instructional keystrokes that system designers and programmers have to make when using a conventional microcomputer keyboard.

Keyport 717 is a flat membrane keyboard with 717 user programmable keys.

Each application program uses a

different flexible plastic coloured overlay to display the active keys. A typical application uses between 150 and 300 keys. The function of each active key is indicated on the overlay by words, symbols or pictures on and around the key itself.

Programming is simplified by eliminating menus and syntax analysis. Once the program has been written the user can see,

select and enter commands without any referral to the application manual. Complex commands are reduced to the touch of a single key.

GCS has priced the Keyport 717 at about £200.

GCS Communications (CW), Orion Park, 226-236 Northolt Avenue, London W13 9QU. Tel: 01-579 9401.

## PRODUCTS

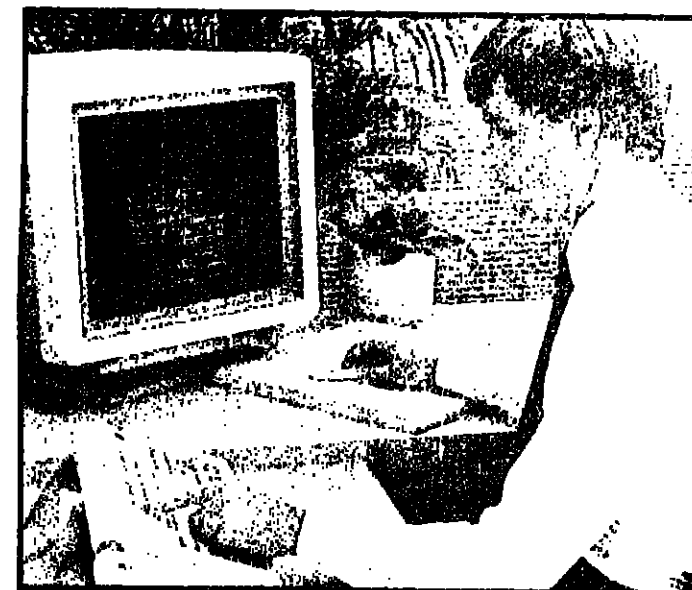
### IBM adds colour for designers

IBM has announced the 5080 Graphics System which offers high function interactive graphics in colour to CAD/CAM users.

The system is designed for ease of use with substantial application flexibility and configurability.

Designers and engineers working on complex drawings, such as circuit board designs, can benefit from the greater separation of detail that colour can bring. It provides high performance, advanced 3-D transformation capability with programmable line types, area fill and programmable pattern generation within the terminal.

The system comprises 5088 graphics channel control unit; 5085 graphics processing unit; 5081 display monitor unit with alphanumeric keyboard, program function keyboard and 5083 tablet and stylus (or cursor); and GAMS/SP Release 2 Graphics Access Method/System Product which supports the full range of functions of the IBM 5080 graphics system.



The IBM 5081 display offers a selection of up to 256 colours.

The 5080 is available in colour and monochrome screen versions.

Each 5081 terminal is provided with a 128K memory as standard with a maximum memory per terminal in excess of one megabyte.

Since the 5081 is a raster unit, the monitor is flicker-free even when complex pictures are displayed.

Under Cadam two colour modes are available on 5080: elemental colour mode and overlay mode.

Both offer 11 colours to the user while five are reserved for use by the Cadam program.

Under Catia 16 colours (two are reserved for Catia) are available and on CAEDS the operator can use 16 pre-defined colours or define names for up to 256 colours.

A system comprising four 16-colour displays costs £92,307.

IBM (CW) PO Box 41, North Harbour, Baltic House, Portsmouth PO6 3AU. Tel: (0705) 694941.

## Colour display generator '35 times faster'

A MODULAR, software-based, configurable colour graphics display generator, the Ramtek 2020, offers 675,000 short vectors per second, 35 times faster than conventional systems.

Capable of single or multi-channel operation, the 2020 can be configured as an extremely fast, high-resolution graphics peripheral for various display requirements, or as online interactive display system with local processing capabilities.

The system is designed for applications such as military command and control, CAD/CAM, seismic exploration, process control and any other application requiring high resolution and performance.

The modular, software-configurable approach of the 2020 is Ramtek's solution for the user who wants to keep pace with the new technology. Because he is not locked into a particular hardware design, the user can upgrade the

system at any point by programming new diskettes.

Designed with pipelined, parallel co-processors and a 32-bit VME bus structure, the 2020 features a sophisticated writable control store implemented in RAM. An internal communication system allows any processor (Module) in the system to communicate with any system component.

A 3.5in microfloppy on the VME bus allows the user to customise the system by augmenting operating software with custom software developed for a particular application.

The 2020 configurations use multiple MC68000 microprocessors. Complex bit manipulations are handled by 2900 family bit-slice processors. Vectors are drawn at 37.74 nanoseconds per pixel.

Ramtek (UK) (CW), Snapprogetti House, Basing View, Basingstoke, Hampshire RG 21 2YU. Tel: (0256) 69541-8.



Shannon Datator offers a full range of Nashua hard discs.

## Firm offers disc range

SHANNON Datator is offering a full range of Nashua hard discs for use with all the major manufacturers of minicomputers.

Front loading and side loading cartridges and multi-platter hard disc packs are available and all are designed to meet or exceed all known industry specifications.

The range is 100% certified error free by the manufacturer and is covered by a five-year guarantee.

Priorities start from £44.50 for cartridges and £170 for disc packs.

Shannon Datator (CW), 36 Croydon Road, Beckenham, Kent BR3 4BH. Tel: 01-650 4818.

# The new Argus Pro-personal. Abe all, a true 16-bit computer.

On performance alone, the new Argus Pro-personal computer is way above the rest. It's a true 8086 based 16-bit machine. And it's fast - 8MHz.

Our Argus Pro-personal also gives you a choice of backing store from floppy right up to big Winchester, and memory up to \$96K.

So you've got the capacity and speed for professional-sized programs, and that means savings in expensive professional time.

### A NEW WORLD OF SOFTWARE

Running industry-standard CP/M-86, the Argus Pro-personal opens your door wide to a vast array of 16-bit application software.

Ferranti also supplies software packages for major applications such as word processing and spreadsheet calculations. Of course the Argus Pro-personal can also run your existing 8-bit software.

It adds up to all the power and capacity you need. Benchmark tests have proved it outperforms its competitors.

### A COMPLETE PACKAGE PUTS YOU ONE UP

Right from the start the Argus Pro-personal gives you what you want. CP/M-86 and BASIC are included. So is 128K of memory - and it's all available to you because the VDU has its own memory for both alphanumeric and high resolution graphics.

Check this out against the competition.

### A COMPUTER WITH THE HUMAN TOUCH

For all its professionalism, the Argus Pro-personal computer is easy to live with. It's user-friendly in every way. Compact and good

looking, with clear characters on an anti-reflective screen. The VDU tilts and swivels, and the keyboard, VDU and processor box can be placed to suit the operator.

CP/M-86 is menu driven so it's easier to use.

### IF YOU'RE LAUNCHING AN AUTOMATED OFFICE

The Argus Pro-personal with the rest of the Ferranti office product range allows access to mainframe computers, so if you want it to be part of a general office automation scheme, there's no problem.

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Behind the Argus Pro-personal computer, a product at the leading edge of a fast moving technology, is a company with over 20 years in the computer business.

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So your investment is protected for the longest possible time. And you get a first-class maintenance service to back it up.

For a high flying computer the Argus Pro-personal price tag is remarkably low level. It starts at just \$2,800.

Ferranti Computer Systems Limited, Simonway, Wythenshawe, Manchester M22 5LA. Telephone: 061-499 3353, Telex: 668084.

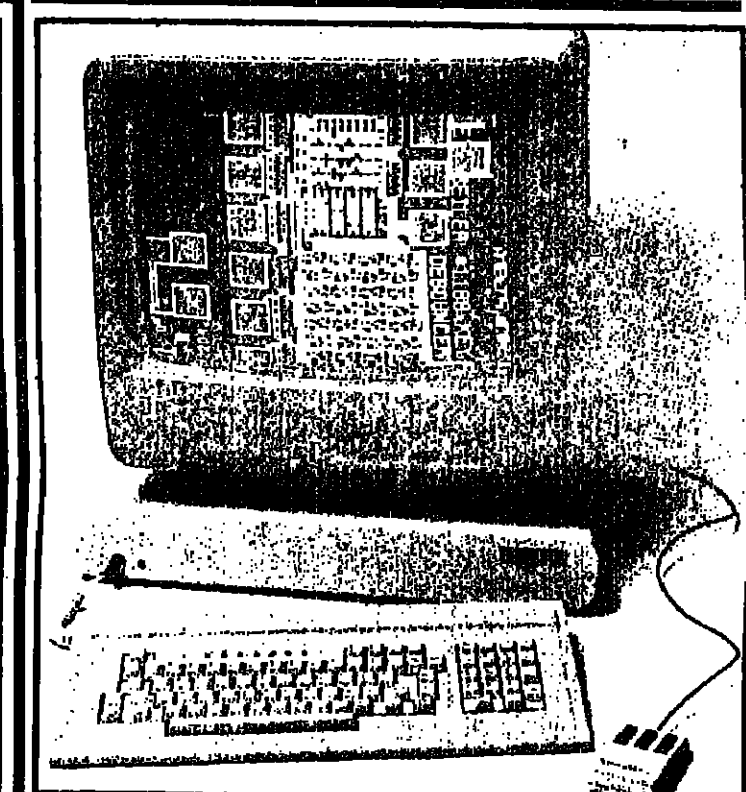
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The AED 1024 colour graphics terminal from Dicol.

## Terminal can show up to 256 colours

A POWERFUL colour graphics terminal with a high resolution display screen, the AED 1024 has been introduced by Advanced Electronics Design and is now available in the UK from sole distributor Dicol Electronics.

The AED 1024 is aimed at applications such as CAD, manufacturing and engineering, process display, simulation, graphics arts and medical display.

Its high resolution screen, 1024x768 pixels, gives precise and smooth colour drawings, the company states. The terminal's anti-aliasing feature and its 1024x1024x8 virtual address space further refine any screen display. The anti-aliasing feature also eliminates the jaggedness of the displayed lines.

A total of 256 colours can be displayed simultaneously from the AED 1024's palette of 16.8 million colours. This feature makes the terminal specially suited to CAD/CAM and graphic arts applications.

The AED 1024 can also emulate the Tektronix 4010 family of storage tube terminals, enabling AED terminal users to take advantage of the vast amount of software available for the Tektronix displays.

The system is compatible with AED's 512 and 767 colour graphics terminals, also supplied by Dicol. All applications software for these terminals will run on the higher resolution 1024. The character font set will accommodate an 80x25 alphanumeric display format, allowing fully formed characters to be displayed in an alphanumeric mode.

A green drafting grid, at selectable intensities, can be turned on and off without affecting the image on the screen.

The AED 1024 has eight memory planes allowing users to create layered designs of any kind of complexity, from multi-level VLSI circuits and PC boards to architectural schematics and detailed images. Each plane can be masked from the others to simplify the image.

A programmable zoom function, with up to 16 stages, and horizontal and vertical scrolling are also among the features.

The AED 1024 sells for £11,000.

Dicol Electronics (CW), Bond Close, Kingsland Industrial Park, Basingstoke, Hants RG24 0QB. Tel: (0256) 61551.



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Closing date for return of applications form 20th January, 1984.

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The Centre specialises in health care management and clinical information systems. It currently provides a service via an extensive terminal network using a Honeywell Sigma 6. A fully distributed network is being implemented using an Ethernet Local Area Network to which various designs (eg, a twin GEC-4190 and various microcomputers) are being attached.

Vacancies exist for two senior posts within the Centre. For the Chief Systems Designer post, applications are invited from candidates who have both experience in application systems design and the ability to plan, co-ordinate and control all aspects of the many transfer and development projects in which the Department is engaged. The Chief Systems Designer deputises for the Director in his absence.

For the Software Manager post, candidates will be expected to have wide experience on various systems from mainframes to micro and will have proven management experience. Experience with telecommunications networks would be an advantage. The Software Manager is responsible for all systems software and programming within the Department.

For both posts, an ADP allowance of up to £564 may be payable. For application form and job description, contact the Personnel Department, St Thomas' Hospital, Lambeth Palace Road, London SE1 7EH. Telephone: 01-928 9292 ext 2422.

For informal discussions, please telephone Dr A. V. Stokes, Director of Computing, on 01-928 9292 ext 2713. Closing date: January 19th, 1984.

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- The Next Step:** If you feel that you could meet the exacting requirements of these positions and would enjoy the challenge, involvement and career development that the company can offer, then please contact Chris Morrow on 01-837 0451 (days) or 01-267 9409 (evenings after 7.00pm) for an informal discussion.

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- \* You must have between 18 months and 2 years' experience as an Analyst/Programmer.
- \* You must be prepared, if you are an analyst who doesn't have programming experience, to acquire it. The proper training will be given.
- \* You must be able to work in a small team. However, at the same time, you will be expected to use your initiative.
- \* You will see the significant advantage that this opportunity presents. Usually companies look for applicants with both relevant hardware and systems experience. Here, this is not the case. The client is far more interested in the potential of the individual.

Our client uses PL/1 with Mantis and Easytrieve and is well aware of the advantages of exploring and using new technology.

Their offices are based in a most attractive part of Surrey, working conditions are of high order and the career opportunity could be very good indeed. There is a sensible promotion path and this will be very clearly explained at the interview.

In the first instance please contact John Goldsmith, quoting Reference Number 421, on 01-631 4184 or write to him at: A & A Consultants (Holding) Ltd, County House, 10 Little Portland Street, London W1N 5DF.



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If you feel that you have the personality and strength of character to handle a challenging role in a fast moving environment then please contact Chris Morrow on 01-837 0461 for further details.



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We're offering you the potential to make yourself a rewarding and challenging career as part of our talented Sales Force - selling specialist business systems to British industry. Our product range covers everything from stationery to computers - it's a successful growth industry, so there's plenty of room for your career to grow.

Whether you're an experienced sales pro. or a newcomer to the field our training programmes will give you a strong background for a high powered career.

If you're aged over 23, with 5 'O' levels or equivalent and have the enthusiasm and determination to win, you will be rewarded with an excellent salary package (realistic first year earnings £10,000, top earners exceed £20,000) and you will receive a company car plus a wide range of big company benefits.

All this and nothing to hold you back! So get out of that bottle - before someone puts the cork in!

Contact us on Freephone 4564 now, or write with CV to Bryan Jones at - Kalamazoo plc, Northfield, Birmingham, B31 2RW.



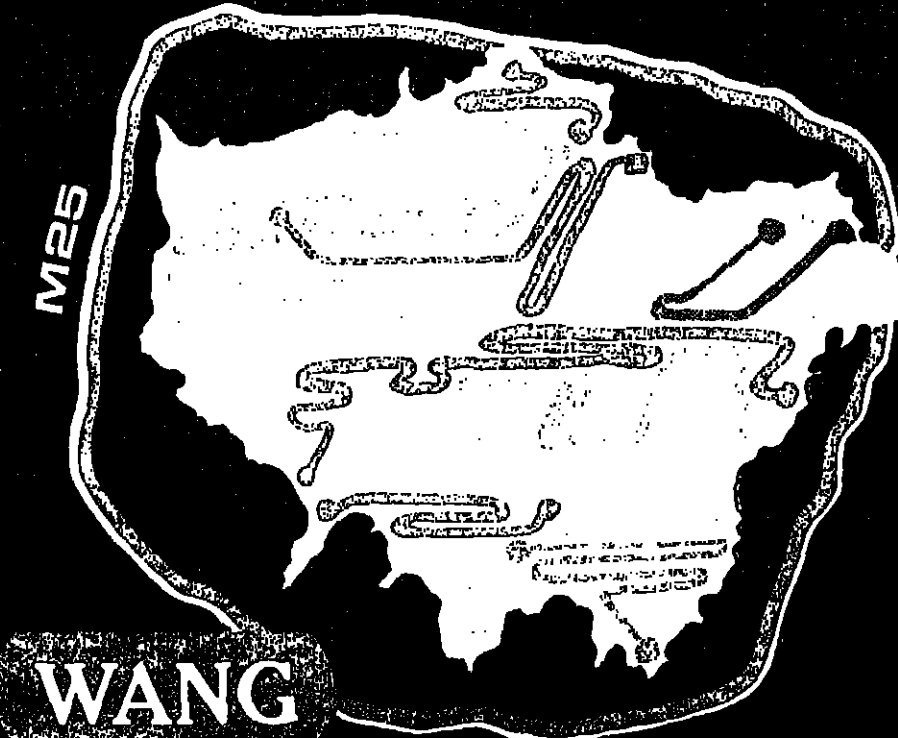
**Kalamazoo**  
business systems

# MANAGEMENT & EXECUTIVE SELECTION

telephone 01-637 9611

## CUSTOMER ENGINEERS

### £9-£13k PACKAGE + CAR



WANG's technical excellence across a large and varied product range of W.P. systems, 16 & 32 bit DP systems and network communications, has enabled them to achieve consistent and unparalleled growth in today's computer industry with sales in excess of \$100 million in the UK alone.

We are looking for high calibre post sales Customer Engineers to join a company that has a large commitment to maintaining this phenomenal growth through ongoing development, of sophisticated hardware and software products. WANG's philosophy is to recognise the career aspirations and needs of the individual, to offer comprehensive training, an excellent benefits package and technologically advanced products.

If you possess two/three years' experience maintaining minis/micros, hard discs and other associated peripherals with customer skills to match, and wish to join the company of the future,

ring Chris Bond or Kirk Blackmore on 01-637 9611.

The Office Automation Computer People.

Suite 201/6 Albany House 324 Regent Street London W1R 5AA 01-637 9611

**MANAGEMENT &  
EXECUTIVE SELECTION**

## INTEL SYSTEMS - CAREER OPPORTUNITIES FOR SOFTWARE SPECIALISTS

INTEL, inventor of the microprocessor and acknowledged leader of the microcomputer industry, is making a major thrust into the computer systems business. The product range is based on the most sophisticated microprocessor products of which Intel is the world's largest supplier.

A key element of this programme is the new EUROPEAN TECHNICAL CENTRE, based at Swindon, which is being established to support customers of our advanced systems products. These range from professional software and hardware development systems to OEM products covering a wide spectrum of commercial applications. We are looking for experienced Systems Software Engineers who relish the chance of joining an exciting project in its initial phase.

Successful candidates will be presented with a rare career opportunity to operate at the forefront of technology. Some travel within Europe and the USA will be required and the necessary training will be provided. Our immediate needs are in four primary product areas.

- \* **DATA BASE MANAGEMENT SYSTEMS** - Opportunities exist for Software Specialists to provide post sales technical support on our advanced data management systems which operate under several Operating Systems. Candidates should be experienced in Systems Programming on IBM, CDC, or Univac mainframe computers although similar experience with other mainframe environments will be considered.
- \* **RMK SYSTEM SOFTWARE** - The RMK product line provides the necessary building blocks to design real time operating systems for our major processors. The RMK operating systems will be extended to work with future processors, maintaining Intel's market leadership. Applicants are required to

have experience in the development of RMK based systems or in the design of unique RMK I/O routines.

- \* **XENIX** - To support our penetration of the commercial systems market we require Specialists with expertise in XENIX and 'C' programming. This post would ideally suit a recent University Graduate with 2-3 years XENIX experience.

- \* **SOFTWARE LANGUAGES AND COMPILERS** - Opportunities exist within our newly formed European Technical Centre to support our high level languages and assemblers, ie PL/M 88, Fortran and Pascal. In depth experience extending over a period of 3 years is desirable.

Successful candidates should be prepared to spend training periods in our European and US facilities.

Our conditions of service match the excellence of our staff and products. Our benefit package is amongst the best in the industry and matches the high expectations we have of our employees - competitive salaries, non-contributory BUPA, life insurance, pension and stock participation plans, plus a generous relocation package where necessary.

If you are looking for a challenging and rewarding career with real prospects for rapid advancement, don't miss this opportunity to join INTEL - the technology leader.

We are continually seeking good people to support our expansion, so by all means call us to see if your experience may suit other positions within the Company.

Ring our hotline on Swindon (0793) 783444 between 9:00 am and 8:00 pm on Friday, 6th January 1984 and ask for Ray Withey or Alan Court. Alternatively, write to or phone Ray Withey, giving details of your career to date at: Personnel Department, Intel Corporation (UK) Ltd, Pipers Way, SWINDON SN3 1RJ. Tel: (0793) 488388.

These vacancies are open to male and female applicants

**intel**

DELIVERS  
THE FUTURE

\* Intel investment in UK will double by 1986

\* Intel UK needs to double its UK staff by 1986

Intel Corporation (UK) Ltd,  
Pipers Way, Swindon,  
Wiltshire SN3 1RJ.  
Tel: Swindon (0793) 488388.





# HIGH TECH Opportunities in Lancashire

CIRCA £9,500

Our client is one of Europe's leading Companies in the design and manufacture of high quality precision printed wiring boards. Since its foundation in the 1970s, the Company has grown at a consistently high rate and future plans envisage the continuation of this expansion. Indeed, the recent acquisition of a further manufacturing facility is evidence of a firm commitment to the future.

The Company assigns a high premium to the contribution made by the Computing Department to the efficiency of the business, and are undertaking a continuing programme of investment in up to date equipment and technology. Currently, the installation comprises Data General MV4000, CI50 and Nova equipment, which are all linked by means of a local area network to the workstations within the Company.

In order to support the next phase of growth, the Company now wishes to expand its Development Team and therefore requires the following computer professionals.

## Analyst Programmers

The Analyst Programmers will work closely with the respective Project Leaders and their responsibilities will include detailed program design, implementation and liaison with users.

## User Support Analyst

The role of the User Support Analyst is to provide a comprehensive support service answering queries, providing advice and helping the users to get the best out of the systems.

For all of the positions, the ideal applicants will be well-educated and possess 2 to 3 years' experience in a manufacturing environment. Application areas of particular interest include work in progress, stock movement, sales and works order processing, product information, and production planning.

As the Company wishes to make use of 4th Generation application development software, a knowledge of database techniques will be most welcome and also for one of the Analyst Programmer positions a sound exposure to CAD/CAM techniques would be an advantage.

For all these positions a salary of circa £9,500 will be offered, together with the sort of benefits to be expected from a go-ahead Company, including a profitshare.

These are genuine opportunities to become part of an exciting and challenging development, working in a high technology environment within very pleasant surroundings in Lancashire.

For more information and to arrange an early interview, contact JOHN WHELAN on 061-833 0427 (24 Hour Answering Service) or 0625 520708 (Evenings 7-9 p.m. and Weekends) or, alternatively, write to me at the Manchester Office address shown below.

Technical, Sales & Management Appointments

**SCR**

Specialist Computer Recruitment Ltd

**SOUTH**  
James House, 40 James Street,  
London W1M 6PS  
01-838 0671/488 0481

**MIDLANDS & INTERNATIONAL**  
36-37 Great Charles Street,  
Quintonway, Birmingham B3 3JY  
01-236 3761

**NORTH**  
International House, 94 Carnegie,  
Manchester M2 5EE  
061-833 0427

**BELGIUM**  
Avenue Louise 327,  
B-1050 Brussels,  
010 222-840 7161/71

**HOLLAND**  
Waterlooplein 22  
1071 AS Amsterdam  
010 2120-7609/17

# PROJECT MANAGERS

To £20,000 p.a. plus car and benefits.

## The Job:

To manage the development and installation of a wide variety of software systems on a bespoke and package basis within the financial and commercial sectors. Duties include client liaison, consultancy studies, estimation of project duration and production of tenders, as well as the overall control of teams of personnel.

## The Company:

A systems house with an excellent reputation for the quality of its products and systems and a good growth record throughout its history. The current recruitment drive is regarded as essential to the continued expansion of the business and the successful candidates will be expected to make significant contributions to the formulation and achievement of future business plans.

## The Requirement:

It is essential that prospective candidates should have had considerable experience of project management and that they should be able to demonstrate a track record of successfully implementing both large and small scale projects. In addition it is of considerable importance that they should have a fundamental understanding of commercial requirements and sufficient business acumen to negotiate effectively at a senior level with clients. Moreover, they should be stimulated by the challenge of assuming profit responsibility in a highly competitive industry. Previous systems house experience would be an asset but we would be interested in hearing from people outside that environment who feel that they could make a contribution in the role described.

## The Rewards:

The successful candidates will enjoy challenge, responsibility and an ever changing environment in which to use their skills. Remuneration will be by way of a high basic salary, a Company car and benefits. In addition there will be the opportunity to participate in the Company profits by way of a bonus scheme.

## Location:

The position is based in London.

## Interested?

Then please telephone Chris Morrow on 01-837 0451 for further information.

**TOTAL SELECTION LIMITED**

388, City Road, London EC1V 2QA

01-837 0451

هكذا منه الأصل



## FREELANCE OVERSEAS OPPORTUNITIES THE ARABIAN GULF

For the salary of £15K to £30K. Free accommodation, sports facilities, medical insurance, etc. Choose from these opportunities.

**SAUDI ARABIA** Work for the world's largest oil producer, with the latest IBM equipment.

- BUSINESS ANALYSTS** Design, develop, implement a major personnel and payroll system. 10 years' DP experience.
- SYSTEMS ANALYSTS** Course development. Develop classroom and computer-leased courses especially for Arab staff. Three years' DP education. Five years' DP technical knowledge.
- CLASSROOM INSTRUCTOR** MVS, JES2 Operations. Familiarity with 3081 environment.
- ANALYST PROGRAMMERS** Both commercial and scientific. Over five years' DP, PL/1 or Fortran, TSO/SPF. Large IBM background.

**ABU DHABI** Also in an oil environment - pleasant lifestyle.

- DATABASE DESIGNER/ADMINISTRATOR** MVS, DL1, minimum 10 years' DP.
- OPERATIONS SUPERVISOR** 4341, VM DOS/VSE
- SENIOR PROGRAMMER** COBOL, DL1 (DOS or OS)
- INSTRUCTOR** VM, CMS Systems

**QATAR** A comfortable university environment, with all facilities

**PROGRAMMERS + ANALYST** Arabic-speaking, with academic/university backgrounds

For further details contact Bill Torbitt on Farnborough (0252) 516141.

## USA

Various locations throughout the USA, including: Boston, Baltimore, Chicago, Washington, New York and San Francisco

Programming skills required:

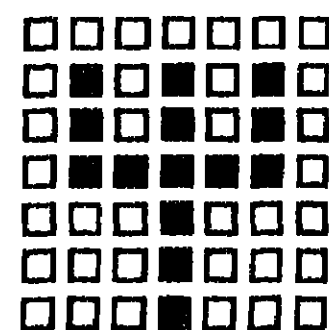
- ★ IBM COBOL CICS AND DL1
- ★ IBM COBOL IMS DB/DC
- ★ IBM COBOL WITH DL1
- ★ IBM COBOL IMS AND ADF
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These contracts will be for six or twelve months (extendable) and the package will include:

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- ★ GOOD RATES OF PAY
- ★ ACCOMMODATION OR ASSISTANCE
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- ★ RETURN AIR FARE
- ★ TAX AND LEGAL ADVICE
- ★ SUPPORT FROM OUR U.S. OFFICE IN BOSTON

For further details contact Steve Whiting on Farnborough (0252) 516141

(7110)



# TRIDENT

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38/44 VICTORIA ROAD, FARNBOROUGH,  
HANTS, GU14 7UD.  
Telex: 858 233 Tel: Farnborough (0252) 516141

# COMPUTER SERVICES GROUP PLC

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# Our Client...

In an everchanging market we are constantly seeking d.p. professionals at various levels to meet our clients' requirements. Below we have detailed a selection of our clients' needs, however should you be looking for an alternative career change, other than those mentioned, we are also in an excellent position to advise on your next move. For more information call us or return the FREEPOST coupon today.

## DIGITAL EQUIPMENT COMPANY LIMITED

London  
Epsom  
and Welwyn

Negotiable  
Salary  
& Car

To the Digital Equipment Company the need for the very best personnel cannot be stressed too highly. In the areas of Pre-Sales Analysis and Post-Sales service, that philosophy is most stringently adhered to, as these same individuals represent the Company at the most critical levels.

You will require technical expertise, as well as your undoubted interpersonal skills, to handle all of the problems you may have to face. Therefore, where necessary, full technical training will be provided if you have the potential we are looking for.

We are searching for a number of individuals with varying degrees of experience in the following areas:-

### 1. Pre-Sales Analysts

We seek career minded individuals to interface with our clients from the boardroom to the shop floor. We would be especially interested in Communications or Office Automation expertise.

Ref. 0801

### 2. Post Sales Support

To deal with clients in a post sales environment at the very highest levels, co-ordinating a number of internal functions to supply our clients with the support service they need and expect.

Ref. 0802

### 3. Software Support

You will be working on solving specific client problems, installing software, configuring, sizing and acting as a software consultant. You will need some experience of RSTS/E or RSX11-M system Software. Full training in VMS will be supplied if required.

Ref. 0803

### 4. Field Service Engineers

Engineers are required throughout the region at all levels. We are prepared to retrain you on DEC kit where necessary.

Ref. 0804

We offer a number of benefits including a highly competitive salary, a company car, a thoroughly professional team that is committed to excellence, and all the support that the world's second largest computer manufacturer can provide.

To find out more please telephone or clip the freepost coupon, making sure you fill in the relevant reference number, and by return you will receive a client company profile and application form.

## SAUDI ARABIA

Our client, a leading distributor for the complete range of PRIME hardware/software is currently seeking the following professionals to join the team and maintain its position as a market leader in the Kingdom

**CAD/CAM SOFTWARE SPECIALIST**  
To £25,000 Tax Free

Based in Al Khobar you will provide support and consultancy services to our clients who use the MEDUSA system. A thorough knowledge of CAD/CAM with particular emphasis on the application of MEDUSA is essential combined with good communicating skills. Further CAD/CAM products are to be introduced in the near future.

### EDP SALES EXECUTIVES

**Salary + commission - potential earnings £30,000 + Tax Free**  
Operating from offices in Riyadh, Jeddah and Al Khobar successful candidates will be selling the whole range of PRIME products to the private and public sector.

Extensive experience of computer sales with an up to date knowledge of information technology is a prerequisite. Knowledge of Arabic an advantage but not essential.

Both the above positions are on a one to two year contract basis and offer free accommodation on married or single status, a car allowance plus other fringe benefits.

Contact us by sending a written application to:  
Chemsult Limited, 23 Pembridge Square, Notting Hill Gate,  
London W2 4DR. Tel: 01-243 0504.

# CHEMSULT

## IBM BUSINESS SYSTEMS CONSULTANTS AND TECHNICAL CONSULTANTS

Thames Valley £11,500-£14,500 + car

Our client, one of the world's leading UK based Financial Services Companies, wishes to recruit Consultants aged between 30-38 who have a strong Financial Accounting background, gained in Banking, Commercial or Industrial environments.

**SYSTEMS CONSULTANTS** should be of degree level with 5 years' minimum DP experience in a large IBM OS or DOS environment, (ICL experience would be useful).

Areas of expertise should be ACCOUNTS RECEIVABLE/PAYABLE or ORDER PROCESSING. Experience of the Package Industry would be a distinct advantage.

One of the positions requires a **PART-QUALIFIED ACCOUNTANT** with GENERAL LEDGER experience, currently working as a systems analyst or project leader. (Ref No. 7415)

**TECHNICAL CONSULTANTS** must have a minimum of 5 years in a Technical Programming capacity using MVS, DOS/VSE, CICS, COBOL and ASSEMBLER. Any knowledge of DL/1, IMS or IDMS would be an added advantage. (Ref No. 7414)

All successful candidates must have good communicative skills as responsibilities for each position will include giving presentations and customer training.

For more information and a chance to join a company that's a leader in its field of developing financial packages, contact SHIRLEY FRANCIS on the number below or 0838 751564, between 7-9pm quoting Ref No.

Lloyd Chapman  
Associates

123, New Bond Street, London W1Y 0HR 01-499 7761

## DATA ARCHITECTS SYSTEMS LIMITED

COBOL  
Programmers  
and Analyst  
Programmers

Negotiable  
Salary  
& Car

We seek a number of creative individuals, to work on development of interactive financial systems based on TANDEM hardware. Ideally you will have had in excess of twelve months' Tandem experience, however, those with a sound background in Interactive COBOL systems development will be given full training on Tandem machinery. The jobs are based in London. Salaries will be negotiated on an individual basis and a company car will normally be provided as part of the benefits package. To find out more about the company and these positions, please telephone the number below or clip the coupon quoting reference 0805 and by return you will receive an application form and client company profile.

We have a number of other clients in the Greater London Area whose requirements vary from those mentioned above. This is a shortlist of vacancies of which we are aware.

- IBM Mainframe Senior Analyst Programmers and Analyst Programmers.** Preferably with Database and TP experience, Cobol or PL1.
- IBM GSD Analyst Programmers.** To work either in a banking environment or the Oil Business.
- IBM Systems Programmers.** DOS/VSE, OS/MVS, MVS/SP or move up to XA.
- REAL TIME SOFTWARE DEVELOPMENT.** To develop system software in a communications or DBMS environment probably encompassing Office Automation UNIX, C, PASCAL, BCPL, etc.
- ICL COBOL, IDMS, TP, TPMS.** We have a number of opportunities throughout Southern England at various levels and salaries.

(7064)

## The Measure of Success

If you measure your success by the amount of recognition and satisfaction you get from doing a good job - READ ON.

Our Client, part of a highly diversified multi-national organisation, is involved in the exploration and development of the world's oil reserves. They are offering high rewards and enormous career potential to individuals with the interpersonal skills required for their intensive systems development program.

Initially based in Aberdeen, successful applicants will be

working as Analyst Programmers and Senior Analyst Programmers developing computerised systems to support clearly defined business problems.

Ideally you will have IBM GSD Systems experience, but, because you will be working within one of the fastest growing and most profitable organisations in the world, you must share the same motivation for success - if you do, the opportunities within the group will certainly measure up to your expectations.

If you feel that you have the qualities we are looking for and you want to work in an environment where good people get noticed, then please telephone the number below quoting Reference 0806 or alternatively complete the FREEPOST coupon. By return we will send you an application form and client company profile.

By return of post, please send an application form and client company profile to:

Name: .....

Address: .....

Home tel. no.: .....

Business tel. no.: ..... (Used with discretion)

I am interested in the following position(s) - 0801 ☐ 0802 ☐ 0803 ☐ 0804 ☐ 0805 ☐ 0806 ☐ other ☐ Please tick appropriate box.

**CS COMPUTASTAFF**

FREEPOST, London SW1H 9BR. 01-222 6722. Telex: 894364.



# Project Management...

with Cornhill Insurance, a household name synonymous with sustained growth and unsurpassed customer service.

Based in historic Guildford, project management in Cornhill offers successful candidates the opportunity of controlling large scale system developments, utilising advanced IBM mainframe and distributed processing facilities, in a sophisticated database and telecommunications environment.

The prime requirement is for proven project management skills, through all stages of development, allied to a solid portfolio of d.p. experience, including substantial systems analysis exposure. Familiarity with the insurance industry, or an allied business sector would be particularly advantageous and the ability to liaise effectively with senior management is essential.

An attractive remuneration package, to £14,800, is offered comprising good base salary and subsidised mortgage. Additional benefits include free medical insurance and senior grades of staff qualify for a COMPANY CAR. Exceptional relocation expenses are provided as appropriate.

To apply, please send a C.V. or write or telephone for an application form, to JOHN KITCHEN at the address below, quoting reference number GW1176.



(7044)

BIS Applied Systems Limited  
York House, 199 Westminster Bridge Road  
London SE1 7UT  
Telephone 01-633 0866

BIS Applied Systems

## Database Specialist

G. D. Searle is a major international pharmaceutical company whose Research and Development Division at High Wycombe is one of the world leaders in the fields of chemically and biologically derived medical products. Expansion of the Computing Department has led to the need for a specialist in Database systems on a VAX cluster.

This new post within the Research and Development Division Computing Department has been created to develop database systems. The initial work will include the installation and application of a database management system (1032) to assist the data handling requirements of the European Clinical Research Department which is actively engaged in collecting, analysing and reporting data from clinical trials. Applications of the database management system in other areas of the R & D Division will follow.

The Computing Department makes use of DEC equipment and currently has two VAX-11/780 systems linked via DECnet to other systems in the USA and France. A number of smaller PDP systems are used for specific applications. Approximately 150 terminals provide access to the computer systems.

It is essential that the applicant, who will be a graduate preferable age 25-30, has experience in using a VAX with VMS operating system and either Fortran or Pascal programming language. It is also important to have experience in using a relational database management system and preferably to have used RMS facilities to optimise file design. The work will involve close liaison with scientific, statistics and administrative staff and will necessitate much "hands on work" on the VAX systems.

The Company offers excellent salaries, 23 days' holiday plus eight statutory holidays, contributory pension fund, including free life assurance, a subsidised health insurance scheme, subsidised cafeteria, recreation club and pleasant offices in an attractive location in the Chiltern Hills.

Please apply to Rod Cook, Assistant Personnel Manager, Searle Research & Development, Lane End Road, High Wycombe, Bucks. (Tel. High Wycombe 21124 ext 3372), quoting reference CIE01.

(7051)

SEARLE

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- \* MICROPROCESSORS

For these opportunities and more call:  
JACKIE on 01-543 4844 days or 0443 8888 evenings.  
ALL THINGS PEOPLE (A/P)

(6610)

## DATA COMMUNICATIONS TECHNICIAN

SALARY TO £9,000 P.A.

LSI Logic, a leader in the field of custom designed integrated circuits, requires an experienced Data Communications Technician to support its new European facility based in Boreham, Essex.

The successful candidate must have two to three years' experience of Data Communications and demonstrate a working knowledge of:

- \* Digital and analog network operations
- \* Circuit installations
- \* Modern circuit configurations routines
- \* ASCII - EBCDIC protocols
- \* Data communications test equipment
- \* SNA/SDLC architectures
- \* Troubleshooting procedures

Primary responsibilities consist of assisting the Regional Communications Manager with maintenance and installation of local and international networks.

We offer a competitive salary and an outstanding benefits package. Some travel may be required. Career prospects are exceptional.

For consideration of this position please send a full c.v. to:  
Communications Manager  
LSI LOGIC LIMITED  
Granville Place, The Ring  
Boreham, Essex. S912 1BP

(7110)

## Data Processing Manager

c £12,000 plus benefits

We are a private company (Turnover exceeds £16m) with interests in Employment Agencies and Hotels. Due to continued expansion of the Group we are currently updating our Accounts Computer System to an IBM S36 with bespoke software.

We also have in our operations an ICL S25 and several wordprocessors and it is our intention to continue the computerisation of our operations by installing a London network of 6 offices linked to a central database also on an IBM S36.

If you have recent IBM S34 or S36 experience and believe you could coordinate, implement and maintain our computerisation programme, then we would like to hear from you.

Applications in writing with full C.V. to "The Group Financial Controller".



**Career Care**  
GROUP HOLDINGS LIMITED  
5/7 Glen House, Stag Place,  
Victoria SW1.

We have recently taken Burroughs distributorship in the lower Gt and have vacancies for the following:

### SALES PERSONNEL (c.£18,000 p.a.)

Would be responsible for selling complete range of Burroughs micros, minis and mainframes along with operating and applications software. The applicants should have a minimum of five years' of proven experience in selling hardware and software, thorough knowledge of the state of the art. Should possess good personality and be able to communicate effectively. Preferred age 30-40 years.

### SYSTEMS PERSONNEL (c.£12,000 p.a.)

The systems personnel would provide support to the sales staff. Would be responsible for preparing technical proposals for hardware and software based on customer's requirements, arranging demonstrations, identifying appropriate software packages, tailoring to meet customer's needs, etc. The candidate should have at least five years' in the responsible capacity in electronics. Knowledge of Burroughs operating systems and Cobol essential. Preferred age around 30 years.

### COMPUTER HARDWARE MAINTENANCE ENGINEERS (c.£10,000 p.a.)

Would be responsible for maintenance of Burroughs micros, minis and mainframes and their peripherals at customer sites as well as in-house. Applicants must have at least five years' of experience. Persons with suitable academic qualifications in electronics would be preferred. Age around 30 years.

The persons we are looking for should be dynamic and results oriented, capable of considerable effort to enable the company to make an early break-through in a highly competitive market. Experience with Burroughs would be a definite advantage.

Beside an attractive salary the company offers free accommodation, transport and many other benefits. There are no taxes in the country which also provides most attractive and friendly surroundings.

Apply immediately but not later than one week from the date of this advertisement. Give full particulars of education, experience, nationality and passport no. etc. Addressed to:

Mr S. H. Naqvi  
c/o E.A.S.T. Int'l. Ltd  
11 Hamilton House  
81 Southampton Row  
London WC1

(700)

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### MIN 1 YEAR CONTRACT - PREMIUM RATES

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SYSTEM 38  
AS MARKET LEADERS WE  
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EUROLINK



## Hydraulics Research

### Wallingford

### HEAD OF COMPUTING SERVICES

£11,500 to £15,000

Hydraulics Research, Wallingford, is a forward looking private sector company recently transferred from central Government, having a reputation extending over 30 years as a centre of excellence in civil engineering hydraulics. Our central computer facilities are based on an ICL 2972 and a distributed network of DEC PDP 11s serve the experimental facilities. Mini and micro-computers are also used for a number of other dedicated and general-purpose applications.

A vacancy has arisen for a Head of Computing Services Manager who will report to the Head of Technical Services and will be responsible for providing a broad scientific computing service to research staff. As well as the supervision of operations and systems and programming staff, the manager will take a leading role in the development of with research staff in formulating proposals for outside clients. Applicants should have a degree in Computing or an allied relevant discipline and have at least five years' experience of managing staff and programming and support, preferably involving the use of ICL and DEC equipment in scientific applications.

In addition to the salary quoted, the company provides a non-contributory index-linked pension scheme (equivalent to 21% of salary), flexible working hours and a subsidised staff restaurant. For an application form please contact Mrs C. Thomas, Hydraulics Research Limited, Wallingford, Oxon OX10 8BA. Telephone 0491 35351 ext. 270.

(6079)



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IBM Assembler Progs.  
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IBM CICS Sys. Prog. + Support  
IBM PL1, some with JSP  
IBM COBOL IMS DB/DC  
IBM COBOL with DL1 Progs.  
IBM COBOL CICS DL1 Progs.  
IBM OS MVS Systems Prog.  
IBM System 38 RPG III  
IBM MANTIS Progs.  
IBM PL1 IMS DB ADF  
IBM PL1 with Database Progs.  
IBM RAMIS Progs.  
IBM COBOL IMS with ADF  
IBM DOS/VSE Systems Prog.  
ICL 2900 VMEB Systems Prog.  
ICL TOTAL Analyst  
ICL VMEB Analyst  
ICL 2900 VME COBOL, some with TPS  
ICL TOTAL Progs.  
ICL IDMS Database Analyst  
ICL Systems 25 Designer and Progs.  
ICL VMEB IDMS, COBOL, all levels, some with TPMS  
ICL VMEB COBOL with SCL  
INTEL 8086 PLM Progs.  
INTEL PASCAL Progs.  
Technical Authors  
TANDEM Analyst/Progs.  
UNIVAC 1100 COBOL Progs.  
UNIVAC 1100 COBOL Analyst/Prog. URGENT!  
VAX Systel COBOL Prog.  
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SC 104  
SC 109  
DB 162  
DB 192  
PH 172  
PH 213  
SC 186  
PH 115  
CW 228  
DL/DP 116  
DB/DL 120  
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PH 256  
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PH 159  
DB 224  
CW 253  
CW 220  
PH/DL 101  
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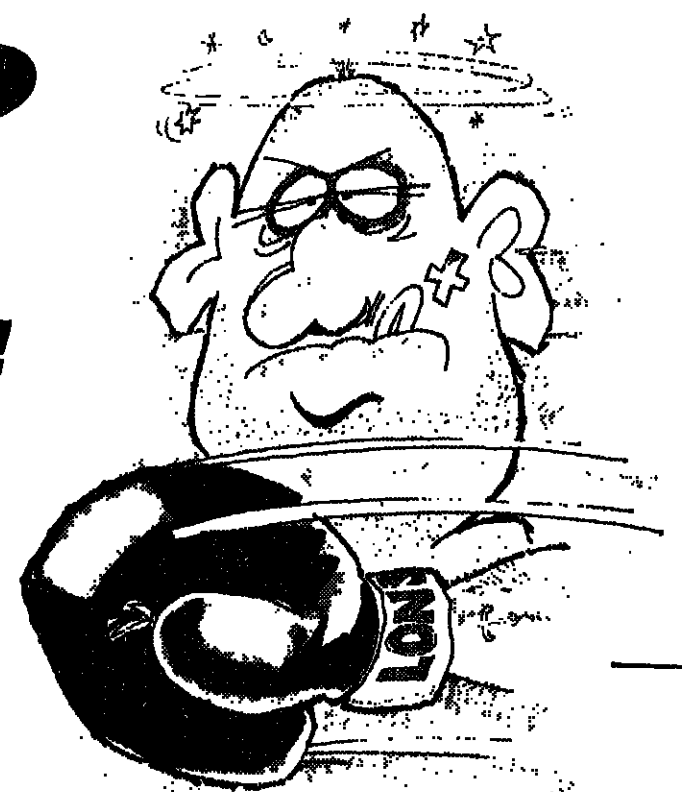
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Ref: L46/C

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(0821)

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For its fast-growing overseas activities. Based in London, the position will offer an attractive salary package commensurate with the seniority of the position.

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S.W.

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# Communications Specialists

## Analysts to Senior Consultants

Holland  
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A number of vacancies have arisen for both Freelance and Permanent staff including a project for one of our major clients, based on the South Coast, to design and develop a new communications product. Suitable applicants should possess a degree or similar qualifications. A good knowledge of Assembler and at least one high level block structured language together with relevant experience in any of the following communications environments:-

- Telephony, Message Switching
- Operating Systems, Telex
- Packet Switching
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Where a project is remote from Aylesbury, subsistence payments are often payable in addition to salary or fees.

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based near Cambridge

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Reporting to the Data Centre Manager you will be responsible for the implementation and use of software on the VAX and for the forward development of a number of key services utilising modified and standard software packages. You will also provide advice and guidance to staff to ensure the efficient use and development of software.

You will be of graduate calibre with technical training and three years' experience of operating systems and systems software, preferably VAX. Effective communication with all levels of staff and the ability to plan a heavy technical workload are essential.

### Data Centre Manager

You will be responsible for setting up the new Data Centre, installing hardware, setting up the software environment, implementing new application systems which are based on tried and tested packages and providing live services seven days a week, twenty four hours a day. You will be assisted in these tasks by a team of project managers and consultants. You will be a graduate or equivalent, with at least five years' systems experience to include computer operations management, project management, and, preferably some consultancy. The ability to motivate staff and take decisions is essential as is the ability to work under pressure to achieve deadlines and budgets.

### Operations Supervisor

You will report to the Data Centre Manager and have full responsibility for the day to day running of all computer operations. You will also be heavily involved in setting up on-line and batch facilities for Production and Head Office staff.

You will have three years' computer operations experience, preferably with some VAX working. The ability to plan, communicate and run a secure, clean and efficient installation, are necessary pre-requisites.

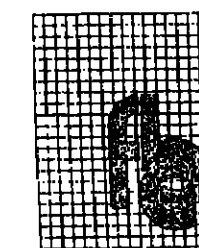
### Analyst/Programmer

You will assist the Senior Analyst/Programmer with the implementation and use of software on the VAX 11/780. You will also specify, design, and carry out modifications to software packages as well as being involved in some development work.

You will be of graduate calibre with at least two years' computing experience with a technical or commercial background preferably in a science based industry.

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ELECTRONIC OFFICE SYSTEMS ANALYST/PROGRAMMERS  
REDIFON EDITOR PROGRAMMER WITH VIEWDATA  
UNIVAC 1100 COBOL PROGRAMMER (BANKING EXPERIENCE)  
INTEL MDS ASSEMBLER PROGRAMMER  
PDP RSX11M CORAL 66 & MACRO 11 PROGRAMMER/ANALYST  
VAX, VME SOFTWARE PROGRAMMERS WITH PASCAL & 'C'  
DATA GENERAL BUSINESS BASIC PROGRAMMERS  
DATA GENERAL, AOS, INFOS COBOL PROGRAMMERS  
DATA GENERAL, CS COBOL PROGRAMMERS  
HP 3000 RAPID PROGRAMMER  
HP 3000 COBOL PROG. (18 MONTHS TOTAL PROGRAMMING EXP.)  
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The department for which we are recruiting has the important role of supporting the use of information engineering by the applications development team. This support is provided through the provision of internal consultants as well as evaluating current practices, tools and aids, and introducing improvements.

Our vacancies will interest those who are already senior systems analysts or equivalents, and who have a good knowledge of information engineering, data analysis or a related structured analysis technique. They will be able to demonstrate a professional approach to technical problems and human relations as well as an ability to think logically and to communicate well.

If you are definitely interested in a career with one of the world's leaders in EDP please air mail a resume to:

Manager  
Staff Services  
Databank Systems Limited  
PO Box 3647  
Wellington  
NEW ZEALAND

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Outstanding opportunities to join progressive companies expanding rapidly in the U.K. and European computer industry.

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Applicants should have had experience at management level within a computing department responsible for the maintenance and development of a wide range of applications. Experience of mainframe ICL equipment would be desirable but is not essential.

Health Service conditions of service and superannuation arrangements apply to this appointment.

Further details and a form of application may be obtained from the Clerk to the Board, Dental Estimates Board, Eastbourne, East Sussex BN20 8AD (0323 25562). Closing date for the receipt of completed applications: January 5, 1984.

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## CAD/CAM PROFESSIONALS SOFTWARE AND HARDWARE to £16,000

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Based in the South of England the company offers secure employment, exciting prospects and a first class salary and relocation package. This is a unique opportunity in both career advancement and lifestyle.

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£8-15K

Our client is a major supplier of application software to users of the IBM System/34, System/36, and System/38 range of equipment. In addition to the U.K., its products are in use in the U.S.A., Europe, Far East and the Middle East. The company has three offices in the U.K.; in Central London, the West Country, and the Midlands and is expanding rapidly. Due to this growth, they are in the process of relocating their Central London office to larger offices near Staines, Middlesex. This has created a number of career opportunities for high calibre people:

### Project Leaders

Applicants must be able to demonstrate a high degree of technical competence (preferably on IBM System/34, /36, /38 computers), a sound understanding of business, and the ability to work with system users in developing and implementing large scale projects. You will be expected to accept total responsibility for projects to which you are assigned, including control of the project teams.

### Analyst/Programmers

Applicants should possess sound programming skills preferably in RPGII and/or RPGIII. (Other languages will be considered if applicants demonstrate the ability to learn quickly). Systems experience in a business environment is preferred. These positions offer work on both package implementation and bespoke systems, together with a career path into senior responsibilities.

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Please send a full cv, or telephone or write for an application form, to Ivor Harland, Ref: M789464/CW.

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The product we are going to sell is a new general protocol converter and associated equipment, manufactured in Holland.

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The man we are looking for must be familiar in detail with asynchronous and synchronous protocols such as IBM BSC/SDLC, Burroughs poll/select, and must be able to quickly familiarise himself with all aspects of (RS232 based) data communications procedures.

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Having representative housing in the vicinity of London with a spare office room and telephone for operations would be an asset.

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- Company car and expenses
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- Two to three months' training in Holland (one trial period)

If you are interested, write and supply us with following details:

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- Requested salary and emoluments

**INCA** Amersfoortseweg 15, P.O.B. 21  
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## TECHNICAL SUPPORT MANAGER

Longman Group is a leading British publisher and is active in publishing software packages for school, home and professional use. Longman is looking to strengthen its creative team for home learning software by the addition of a Technical Support Manager.

The requirement is for a good working knowledge of 6502 Assembly language (a working knowledge of 8080 is desirable but not essential). Previous experience of working on computer software in publishing or education will be a considerable advantage. The person selected will work as part of a team both designing and commissioning entertaining software for learning purposes and will require a creative and entrepreneurial outlook.

Please write enclosing a full curriculum vitae together with salary expectation to:-

Mrs. Sally Ingle, Personnel Manager, Longman Group,  
Longman House, Burnt Mill, Harlow, Essex CM20 2JE

**Longman**

(7100)

## DATA PROCESSING MANAGER LONDON

Samuelson Group PLC, suppliers of equipment and services to the Film and Television Industries, require a Data Processing Manager for an established ICL 2804 installation. The position will carry day to day responsibility for the installation and for the future direction of its systems capability.

The successful candidate must be able to demonstrate good technical skills in all aspects of ICL 2804, RPG3 programming, systems and development experience is essential.

Applications including details of experience and current salary should be made to:

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We also have vacancies for Perkin Elmer 3200 and HP3000 Programmers and Analysts.

Ref 0501/A

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This systems house is seeking computer professionals capable of responding to a variety of technical challenges. Ambitious Analyst/Programmers with a degree and three years' experience of defence, information or industrial real-time applications would be of great interest. Familiarity with Assembler or real-time/mathematical languages is desirable.

Ref 0501/B

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Ref 0501/C

## Electronics Engineers

**Surrey** Up to £13.5K

Vacancies exist for candidates with a qualification in electronics and at least two years' software development experience to work on complex defence systems. Microprocessor and CORAL or PASCAL experience advantageous. Excellent benefits and relocation offered.

Ref 0501/D

## Sales Executives

**WC1 & Thames Valley** £10K base, £25K OTE + Car

Dealer and OEM Sales experience needed with Micro Business Systems or similar products. Emphasis is on knowledge of Dealership networks, including selection and appraisal, in the Midlands and South.

Ref 0501/E

## Finance Consultants/Project Leaders Surrey Border/London

£14-£18K

If you have sound experience of IBM, DEC or Tandem hardware gained within a banking and/or money market and commodity trading environment, this is an excellent opportunity to make that first move to a top consultancy, or a move to a better one. An out-going personality, coupled with a flexible attitude, is essential.

Ref 0501/F

## Maths/Defence Systems Central and West London

£14K

Mathematicians are needed with skills in modelling, simulation, operational analysis or Artificial Intelligence. Defence Project leader experience or capability is required. Both our clients offer excellent career opportunities and relocation if appropriate.

Ref 0501/G

## Analyst Programmers London/Overseas

Up to £12.5K

Systems house with world wide client base needs Hewlett Packard experts to work on bespoke versions of complex order processing software. Specification and implementation can be overseas - development in London. A minimum of 3 years experience, at least two on HP3000 is needed for these positions.

Ref 0501/H

## Micro S/W Development Herts

£10K + Car

A vacancy exists for an Assembler programmer with a minimum of two years experience to join a software house developing microprocessor based POS products. Well-proven software design skills together with the ability to communicate at all levels is essential.

Ref 0501/I

## Systems Designers (S'ware & H'ware) London, Swindon & Maidenhead

£12-£15K

We are looking for candidates with knowledge of Operating Systems including CP/M, MP/M, UNIX and relevant Assembler and high level languages plus LANs. Experience of market requirements, new product design, office technology and communications. Project Leader potential required.

Ref 0501/J

## REAL TIME SPECIALISTS

**Industrial - Scientific -  
Defence - Technical**  
**£8K - £25K**

The Good News Is

The ever increasing uses to which the computer can be applied, never ceases to amaze. We have clients in London, Home Counties and indeed nationwide who are active in so many exciting yet diverse fields of computing it makes specialist knowledge essential and highly sought after.

The Bad News Is

We haven't nearly enough good people to satisfy the needs of those clients who are urgently seeking:

Programmers/Analysts, Software Engineers/Designers, Project Leaders/Managers, Consultants, and Electronics Engineers. We don't have room to mention all the areas of applications but some of them are as follows:

Communications - Data/Tele - Voice Recognition - Message/Package Switching - LANs - Protocols, Industrial Process Control - Data Acquisition - Instrumentation - Plant Monitoring, M.O.D. Systems - Radar - Navigational Systems - Command & Control - C3 and C3' systems - Electronic Warfare - Man Machine Interfaces, Office Automation, Information Technology, R.P.O.S. systems, Software Tools, Operating Systems, Artificial Intelligence Systems, Expert Systems, Robotics, CAD/CAM Systems, Graphics, Image/Signal Processing. You need in-depth specialist experience of such systems as: DEC PDP-11, VAX, Tandem, Argus, Hewlett Packard, Intel, Motorola etc., with relevant operating systems, UNIX would be most desirable; and have used languages such as: PASCAL, FORTRAN, CORAL, MASCOT, ADA and ASSEMBLER. You need upwards of 2 years experience - got that, then your next move is to pick up the telephone, dial 01-836 9719, any hour of the 24 (week-ends too) and ask for Beryl McLaren, you'll get a personal reply not a recorded message.

01-836 9719

**Specialist recruitment of  
Industrial, Scientific, Defence  
and Technical personnel**

**Jupiter**

Computer Appointments

12-13 Henrietta Street, London WC2

(7032)

## Computer Professionals

### Communications/Electronic Warfare Berks and Herts

£11-£17K

Electronics and/or programming skills with, for some candidates, project leading experience, are needed for both civil and military systems work. Multi micro configurations are used for one system which involves Data Communications. Design of distributed databases and Coral programming background would also be relevant. Degree level candidates should be capable of technical innovation.

Ref 0501/L

### Database Consultants Central London

£15-£20K

Two challenging posts in a consultancy are available for candidates who can demonstrate their ability to act as technical consultants to design projects. At least five years database specialisation spread over more than one host computer system is needed. Dynamic personality with good client skills is also a required attribute.

Ref 0501/M

### Banking Systems London/Herts Border

£17K

This systems house specialises in transaction processing technology and has designed and installed a number of sophisticated networks, mainly in the financial sector. They are seeking a high calibre professional with sound banking experience. Knowledge of Tandem equipment would be viewed with extreme interest but otherwise full training will be provided.

Ref 0501/N

### IBM GSD Analysts and Programmers

£10K upwards

RPG programming skills are required for several vacancies in the locations indicated above. Analysis experience is needed for some posts and at senior levels knowledge of MAAPICS or COPICS could lead to consultancy level appointments for candidates who have led projects and who possess the necessary personal qualities.

Ref 0501/P



Isobel Bruce or David Fletcher 01-405 1006 or write quoting advertisement reference number, 16 Red Lion Square London WC1R 4QS

Recruitment Consultants Licence No. SE5789



Philips Business Systems

**HARDWARE TECHNICAL SPECIALISTS**

**Have you got the professional know-how to take on one of the top technical support opportunities of 1984?**

Philips Business Systems is a leading international company in the field of electronic equipment and systems. We are looking for technical specialists to join our team in the Netherlands and West Germany.

**Product Specialist -**  
Specialist in the field of computer hardware.

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Specialist in the field of computer hardware.

PHILIPS

(7080)

**HOWARD****1984 Contract Assignments**

**System Programmers (2)**  
IBM Assembler, C/C++ Specialist, 4 months, renewable contract based Brussels, £550 pw.

**Programmer Analysts (2)**  
IBM, MPE, COBOL, PL/I preferred, 3-6 months duration manufacturing, UK, £150 pw.

**Network Instructor (1)**  
English speaker, to prepare in-house lectures, utilising UK experience together with USA network literature, 10 weeks solid sessions exp. with in-depth networking knowledge. Ability to lecture, 1 year contract, European based, to £100 pw.

**System Programmers (3)**  
One to install IMS, one to provide JES3 expertise, and one VTAM specialist. Contracts for 1 year initially based in West Germany, £15 to £18 per hr neg.

**Analyst/Applications Support (1)**  
Liaison with tech and non tech managers designing, programming within multinational organisation, be aware of latest hardware/software technology, office automation. Background of mainframe, mini and micros useful, Brussels, 1 year, £500 pw.

**Technical Designers (4)**  
VAX, VMS, UNIX, C, FORTRAN, degree or equivalent exp. hi-tech engineering CAD, CAM, and graphics environment, UK based, 6 months, £ neg.

**Integrated Circuit App. Engineer (1)**  
Engineering background, UK based, Belgian company, self-motivated for custom chip enterprise, to establish UK client base by marketing, £15,000 + car.

**Programmer Analysts (3)**  
Contracts for 1-2 years, N and S England, TANDEM, TAL, essential, finance/banking systems, £600 pw.

**Integrated Circuit Evaluation Consultant (1)**  
Min. 5 years exp. in area of ATE knowledge of test device parametrization, characterisation and associated data handlers, based Brussels £16-£18 ph contract 1-5 years.

**Software Programmers (2)**  
Support, Modify and enhance ARGUS 700, OSCXX operating systems, UK based, 3-6 months, £ATE.

**Quality Assurance Specialist (1)**  
5 years microelectronics exp., tech leader qualities, able to complete full technical evaluation oversee 15 design engineers. Involved with analysis, reliability and methodology, based in Belgium, one year plus contract, £500 + pw.

For more information on UK and overseas contracts please telephone:  
Clive Chatlin on 01-952 8092 or write to him at:  
Howard Organisation International Ltd  
Russell House, 140 High Street,  
Edgware Middx HA8 7BS.

(7080)

**SOFTWARE ENGINEERS**

For a number of years now Interlex has been specialising in the recruitment of personnel for companies who design, develop or use computer based interactive systems in the following areas:-

- Artificial Intelligence
- Networking and Workstation Design
- Defence Systems
- Process Control and Automation
- Image Processing

If you are looking for a new appointment within these areas, then discuss your requirements with Penny Warburg or Clare Newton, our senior consultants on 01-843 0988. Salaries range from £7K to £18K.

**INTERLEX**

HIGH TECHNOLOGY PERSONNEL

IMPERIAL HOUSE LOWER TEDDINGTON ROAD  
KINGSTON UPON THAMES KT1 4RP  
TELEPHONE 01-843 0988  
TELEX 526017 SCOTT G

**SYSTEM CONTROLLER**  
c. £8,200

A progressive and exciting local authority which is going places with systems and a System Controller who will be responsible to the Project Controller (SOLAPS) for the operation of a Prime 760 installation running multi-user site is an essential requirement.

Conditions of employment are excellent and relocation assistance will be given if appropriate.

For job description plus application form telephone Ray North, Assistant Treasurer (0491) 36311 ext 3511 or write to PO Box 22, Croydon, Surrey CR9 1UH.

**BOX NUMBERS**

Box number replies should be addressed to:  
Box Number  
old Computer Weekly  
The Computer House  
Bury, Surrey GU8 4AB

**Technical automation jobs in Holland and West-Germany**

BSO/Automation Technology is a software house employed mainly in the fields of real-time process control and monitoring systems, simulation techniques, data communications, computer networks, distributed systems, computer graphics and compiler construction.

Our clients range from large international organisations such as the European Space Agency to small companies, using micro processors for the first time. Our work consists of projects (both in house and on clients premises) and technical and managerial consultancy.

BSO/AT has 50 employees half of whom are English, and is part of the BSO-group (270 employees), one of the largest in the Netherlands. Vacancies range from:

**programmer to systems designer**  
(to £15,000 and car) (to £18,000 and car)

We are looking for people with 3 to 7 years experience in the design and implementation of real-time industrial or scientific systems on microcomputer or microprocessor systems. Preference will be given to applicants with a good knowledge of one or more assembler languages and at least one of the following high level languages: Pascal, RTL2, Coral 66, PL/M, Fortran. Applicants who can show in-depth experience of a structured programming methodology will also be given preference.

Applications plus CV as well requests for information can be directed to our UK representative, Yvonne Waddell, address: BSO/UK, Foxhills, Rockfield Road, Oxford RH8 0EJ, Surrey, telephone: Oxford (0181 49) 6353 (day and evening). The contact person in Holland is Robbert J. Schalkenburg, personnel manager.

**BSO** BUREAU VOOR SYSTEEMONTWIKKELING  
Postbus 100, 3700 AB Utrecht, tel. 01-49 6353

(7080)

**CONTRACTS JAN/FEB STARTS**

**UNIVAC COBOL - Central London - 6 months.**  
Very interesting project for Analyst/Programmer with DB base and On-Line experience.

**IBM ASSEMBLER Programmer - Surrey - 6 months.**  
Knowledge of PL1 useful.

**ICL SYSTEM 25 ASSEMBLER Programmers, Analysts, grammers, and Designers.** Knowledge of Cobol useful. Immediate start - 6 months.

**Contact MARILYN DAVIDSON or DAVID THOMPSON** 01-836 6775 to ensure the pick of 1984 contracts.

**Computer Personnel International**  
THE COMPUTER RECRUITMENT SERVICE DIVISION OF COMPUTER SYSTEMS AND SERVICES  
30-32 Southampton Street, London WC2. 01-836 6775

**RICHARD CLAY GROUP DEPUTY DATA PROCESSING MANAGER****SALARY c. £11,000**

RICHARD CLAY plc, BUNGAY, SUFFOLK

The Richard Clay Group is one of the largest book manufacturers in Europe. The company provides a service to a number of Group Companies.

An adaptable experienced analyst/programmer is required in the position of Deputy Data Processing Manager in our busy computer department.

In addition to carrying out all aspects of programming, he/she will be involved in system analysis, assessment of software packages and the management of day-to-day computer operations.

Candidates should have three years' RSTS experience in a BASIC PLUS programming environment. Knowledge of CP/M based systems would be an added advantage.

Conditions include:  
Profit sharing - paid for anyone who completes six months' service in one calendar year.  
Hours of work - 8.30am to 12.30pm and 1.30pm to 5pm five days a week.  
Paid holidays - 21 days' in addition to Bank Holidays.  
Pension and Life Assurance - Good contributory scheme.

For further details and application form, please contact:  
Mr D. A. Peters, Personnel Director  
RICHARD CLAY plc  
Bungay, Suffolk NR35 1ED.

# IF YOU'RE STRONGLY MOTIVATED BY STEADY, ROUTINE WORK, LUNCHEON VOUCHERS, SPORTS & SOCIAL CLUB,

**TURN THE PAGE**

We certainly don't offer any of the so-called 'perks' which are designed to soften the rungs of an everyday treadmill.

The positions and financial incentives we offer are stimulating and will attract the people who have neither the time nor inclination to worry about where to spend their L.V.'s.

Delta Data Systems is a medium-sized terminal and micro manufacturer that is committed to growth. It is as a result of this commitment that the following opportunities have arisen which will further develop and strengthen our team of high earning professionals.

**PROGRAMMERS**

Are you looking for a micro-based assembler programming position offering an excellent salary and a technical challenge? Then come and work on our new Pyramid range of micro systems, built here in the U.K.

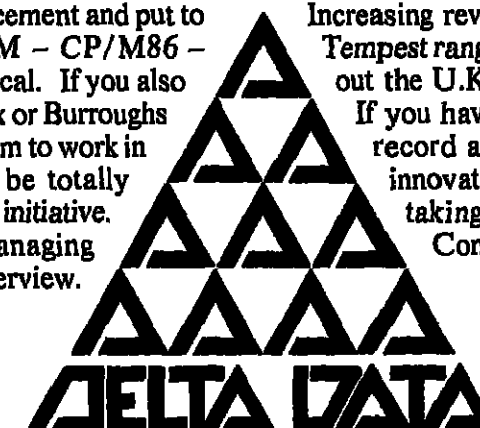
We can match your quest for advancement and put to good use your knowledge of CP/M - CP/M86 - Turbo DOS - Assembler - C or Pascal. If you also have experience of IBM, ICL, Telex or Burroughs communications then we can put them to work in a unique environment which will be totally compatible with your self reliance and initiative. Call Don Whitbread, who is our Managing Consultant, and arrange a local interview.

**SALES EXECUTIVES**

Unlike most companies we want to pay you the earth. You could be our most valuable asset, it's all up to you. We offer an aggressive salary, high commission with a realistic target, accelerators and a 2-litre Sierra G.L.

Increasing revenues from the sales of our Pyramid and Tempest ranges to O.E.M. and large end users throughout the U.K. is your passport away from L.V.'s.

If you have a technical background, a proven track record and want to be part of a company where innovation is encouraged and success yours for the taking, call Don Whitbread, our Managing Consultant, and arrange a local interview.

**Computer Career Consultants**

Chiltern House, Oxford Road, Aylesbury, Bucks HP19 3EQ  
Telephone: Aylesbury (0296) 34436

See it in 1/2p

## PUBLIC SECTOR APPOINTMENTS

ADMINISTRATION DEPARTMENT  
COMPUTER APPLICATIONS  
MANAGER

£12,408 p.a. - £13,725 p.a.

Applications are invited from experienced personnel who can advise and assist the various departments of the Council in mainframe and micro-computer applications.

Experience of O. &amp; M. and related matters would be an advantage.

Please note that the City Council operates a Union Membership Agreement. Closing date: 16th January, 1984.

Further details and application forms obtainable from:



City of Swansea

The Director of Administration, The Guildhall, Swansea SA1 4PN  
Tel 50821 ext 2208UNIVERSITY OF  
DUNDEE  
PROGRAMMER/  
ANALYST

Applications are invited for the post of Programmer/Analyst in the Data Processing Office of the Secretary's Department. The Data Processing Office operates a Honeywell DPS4 (708K bytes main memory, 240 mbytes on-line storage operating under GCOS4) and is involved in maintaining and developing systems on a wide variety of topics relating to University Administration and Finance. Honeywell's IPS on-line software is used extensively. Ideally candidates should have had working experience of COBOL and IPS and if possible RPG II. Salary will be on the Administrative Staff Scale 1B, £8,310-£9,875, depending on previous experience. Further particulars are available from the Personnel Office, The University, Dundee DD1 4HN where applications, giving full career details and the names of three referees, should be sent as soon as possible. Please quote Ref. EST/8/3CV. (7045)

WEST LAMBETH HEALTH  
AUTHORITY  
SHARPEY-SCHAFER CENTRE  
St Thomas' Hospital, London SE1 7EH  
PROJECT OFFICER

Salary Scale: £8446-£9025 inclusive of London Weighting

The Director of Computing is seeking an experienced administrator to assist in the control and management of the Department's work.

The successful candidate ideally will be a graduate with relevant discipline and have at least two years' postgraduate experience of administration in a health service business environment. A working knowledge of computers would be an advantage.

The Centre specialises in applying computing science to health care. The post therefore requires an ability to work in a multi-disciplinary environment. The Centre is situated at St Thomas' Hospital, only a few minutes' walk to Waterloo Station. Facilities include a subsidised staff canteen, season ticket loan scheme and a sports and club.

Please contact the Personnel Department, St Thomas' Hospital, London SE1 7EH, telephone 01-928 9292 ext. 2522 for an application form and job description.

For informal discussions, please telephone Dr A. V. St. Director of Computing, on 01-928 9292 extension 2713. Closing date for completed applications: 19 January, 1984

PUBLIC  
SECTORMACHINE  
SERVICES MANAGER

£11,364-£13,395

Kent Police are currently acquiring a major real-time computer system as well as moving forward in the use of mini-computers, microbased systems and interactive videodata. Our major equipment consists of 2 Burroughs B5800 Miniframe Computers with extensive terminal networks distributed throughout the County, a Burroughs B1900 and 2 Microdata Computers.

The Machine Services Manager will be responsible for the maintenance and development of technical support. A high degree of skill in networking communications and real-time computing is essential together with proven experience in programming, program and software management.

Working conditions are excellent. An essential user car allowance is payable and a leased car scheme is available. Removal and other expenses paid in suitable cases and temporary housing can be made available.

Further detailed particulars and application forms, returnable by 20th January, 1984, from the Assistant Chief Constable, Personnel and Training, Kent County Constabulary, Sutton Road, Maidstone, Phone Maidstone 65432, ext. 212

## KENT COUNTY COUNCIL

THE UNIVERSITY OF LEEDS  
Department of Mechanical  
EngineeringSOFTWARE  
ENGINEER

Applications are invited for two posts of Software Engineer in the Department of Mechanical Engineering to work on a Geometric Modelling project. An interest in or experience in several or all of the following would be particularly welcomed: Integrated Design and Manufacturing, Engineering Design and Analysis, Interactive Design Software and Workstations, Engineering Applications Software, Computational Geometry, Data Base design and implementation, large software systems.

Applicants should have a strong motivation to work closely with the industrial sponsors of this Project in a multi-disciplinary team which will enhance the Geometric modelling system developed during the last three years. The enhancements will be directed towards integrating CAD with CAM in the batch manufacturing environment. The interactive computing facility is based on the 2 x DEC VAX 11/780 which support a wide range of graphics devices.

The appointment will be made for a fixed period of up to three years. Starting salary at an appropriate point within the scale for Other Related Staff (£7190-£16180) according to age, qualifications and experience.

Interested applicants are warmly invited to contact the Project Office on Leeds 431751 ext 7466 for an informal discussion.

Application forms and further particulars may be obtained from the Personnel Office, The University, Leeds LS2 9JT, quoting reference number 87/18A2. Closing date for applications 27 January 1984. (7114)

BIRKBECK COLLEGE  
(University of London)COMPUTER  
PROGRAMMERS

Two vacancies exist in the College Computing Services which operates a network using a DEC Switch and a VAX 11/780 running VMS and providing a local front-end to the University Network and its main hardware (Amdahl V8, Cray 15, etc.) in addition to local computing. They are for:

1. A Senior Programmer/Analyst to provide expert advice and assistance on the local file and data management software (VAX Codedata, Data Dictionary, etc.) for data administration (integrity, availability, dump and recovery and allocation strategies), and for user advice in making efficient use of allocated space (data compression, etc.). At least five years' experience, two in some area of this work is required and ability to assume full responsibility for Data Administration in due course. Salary on scale £12346 to £16311 (inclusive of London Weighting).

2. An Applications Programmer to assist users and develop applications software particularly related to the Amdahl and the Cray. Programming will be mainly in Fortran. An ability to produce clear documentation and to work in close liaison with users is required. Salary on scale £9376 to £12801 (inclusive of London Weighting).

Application forms from the Assistant Secretary (Personnel), Birkbeck College, Malet Street, London, WC2E 7HX (telephone 01-880 8822, ext. 529) or apply with full c.v. in duplicate and names of two referees. (6998)

PERSONNEL AND MANAGEMENT  
SERVICES DEPARTMENT  
IBM SYSTEM 38SENIOR SYSTEMS  
ANALYST

£9,060-£10,539

An experienced Analyst is required to work as part of an enthusiastic team, currently engaged on transferring systems to a SYSTEM 38.

You will need a minimum of two years experience of RPG III and the ability to implement systems quickly. Local Government experience is not essential.

New development areas have been identified which will include word processing and personal computing.

For an informal discussion please contact Mr Ray Witty on Bath (0225) 61111 ext 210.

Relocation benefits include assistance with removal, settling in, house purchase and lodging expenses.

Application form and further details from the Personnel Department, 8A Terrace Walk, Bath BA1 1LW.

Telephone Bath 61111 Ext 468.

Closing date 30 December, 1983.



## PERMANENT

## Programmer

A COBOL programmer currently required to join a small team in this city based company currently involved in development work in the ICL System 25. Foreign travel can be expected after successful implementation in UK office.

## Programmers

Two programmers with two years' experience of COBOL to work on NCR 90/50. NCR experience would be advantageous with FORTRAN and/or communications experience being an asset.

## Part Time Programmers

A large retail company are seeking a COBOL/CICS programmer with experience of DOS/VSE to work a 21 hour week. This company offers good staff discounts plus other associated benefits.

## Senior Programmer

A large development orientated IBM user in the S. W. London/Surrey area is looking for an experienced PL/1 CICS DL/1 programmer to lead a team of programmers. There will be a considerable amount of user contact so communications ability is of prime importance.

## City

## Lancs

## S. W. London

## Surrey

up to £9,000

Ref: 8329/PH

£neg

Ref: 8339/PH

c.£5,000

Ref: 8177/PH

c.£11,000

Ref: 8233/PH

CONTACT PETER HENNESSEY AT KPG

OPPORTUNITIES WITHIN A MAJOR RETAIL CORPORATION BERKSHIRE £NEGOTIABLE + BENEFITS

## Designer/Consultant

Background in Hardware and Software development and interest in micros. Some knowledge of DRS and S25 advantage.

## Validator

To implement and document short term systems trials of hardware and software facilities. Knowledge of DRS or S25 advantage.

## Assembler Programmer

Design implementation of system Software to drive S25 comms. packages.

## Programmers and Designers

Base systems: PASCAL &amp; ASSEMBLER with DRS knowledge.

## Application systems

- 1) Assembler on S25 with DMF III knowledge point of sale terminal applications.
- 2) Applications Blueprint Demo packages using Data Management and Superstructure products.
- 3) VME and COBOL with preferably IDMS/TPMS/DDS
- 3) General applications, based on DRS using COBOL and generation utilities COBOL/CIS COBOL preferably knowledge of DRS.

## Analyst Programmer

System 34/38 RPG III experience, preferably background in banking.

## City

£16K + benefits

Ref: 343/DF

Contact DIANA FABREGAS at KPG or on 01-769 8714 (evenings or weekends)

## Programmers/Analyst Programmers

A progressive British based company specialising in the design and manufacture of highly sophisticated Data Communication equipment is now undergoing a period of rapid growth and development. The challenges are enormous - so too the potential for self-development and success for the right people. If you are creative and would thrive in a dynamic Data Communications environment this is the position for you. Knowledge of DEC, ICL or PRIME equipment also desirable. Opportunities exist from ground floor upwards so graduates with a sound academic record should also apply.

## Systems Programmer

International manufacturing company require S/P to control the installation of an IBM 4341. In depth knowledge of OS/VS1, CICS and ROSCOE together with sound telecommunications experience are pre-requisites. This is an outstanding opportunity for the right person.

## North London

£7,000-£18,000

Ref: 8338/HP

c.£12,000

Ref: 8284/HP

Please contact Haydn Parry at KPG on 01-948 5922

## Systems Consultants

With significant computerisation projects underway in its subsidiaries this major UK company represents an ideal growth environment. Due to an internal promotion they now need an experienced analyst/project leader. You will undertake feasibility studies and advise the companies on hardware/software selection and implementation. The ability to communicate at all levels is essential and successful candidates will receive a generous employment package.

## Analyst/Programmers

A leading sales and distribution organisation with IBM hardware is looking for experienced IBM professionals. With three years' CICS and COBOL in a DOS/VSE environment and two years' DL/1 you will be looking to develop in a user orientated commercial environment. Innovative attitudes will guarantee success in this highly progressive company.

## Programmers

Data General COBOL programmers who have more than a fleeting acquaintance with AOS can look to this household name company for excellent prospects. The environment is DG's and PC's with access to group mainframes - as the site is converting from bureau support to own hardware, career minded programmers can expect rapid promotion to team leader status.

## Central London

c.£14,000 + car

Ref: 8345/MJ

To £12,500

Ref: 8344/MJ

## West London

City

to £12,000

Ref: 8340/MJ

Ring David at KPG on 01-948 5922 or on 01-747 0969 evenings between now and Christmas.

KPG

01-948 5922

KPG Computer Support Services Limited

Cobden House, Park Lane, Richmond, Surrey, TW9 2RA

DIRECTORATE OF DATA  
AND INFORMATION PROCESSING

We are looking for experienced professionals with management ability and commitment to change.

Assistant Director  
(Operations)Assistant Director  
(Systems)

Salary: Ranges from £17,043 to £19,150 (inclusive of London Weighting) JVC for Chief Officers scale

The Computer Unit is being given an enhanced role with its Director as Chief Officer, the policy of the Council is for active development of New Technology on a wide front. The expanded responsibilities of the Computer Directorate include broad aspects of teleprocessing and data communications, Word Processing, micro computer developments as well as a thorough review of present systems which are not based.

Application form from Personnel and Management Services Officer, London Borough of Greenwich, Peggy Middleton House, 50 Woolwich New Road, Woolwich, London SE18 6HQ. Tel: 01-854 8888 ext. 2121. Closing date: January 27th, 1984.

The Council positively welcomes applications from women, ethnic minorities and disabled people.

## GREENWICH

TRENT POLYTECHNIC COMPUTING SERVICES  
CHIEF SYSTEMS PROGRAMMER  
(£10,761-£12,087)

To lead a team of four responsible for the smooth running of systems software on the central Polytechnic computers (DEC2080, PDP11, and in the future VAX). Experience in system programming, low-level languages, communication networks etc would be advantageous. Applicants should be well qualified and have five or six years relevant experience.

Further details and form of application are available from the Staff Officer, Trent Polytechnic, Burton Street, Nottingham NG1 4BU. Closing date January 23, 1984.

## HONG KONG POLYTECHNIC

The Hong Kong Polytechnic is a large institution of advanced education which offers courses in a wide range of subjects up to postgraduate level. In addition to four major academic divisions comprising 18 teaching departments, it also has a number of inter-disciplinary institutes and centres. The Polytechnic invites applications for the following post from September 1984:

Principal Lecturer/Senior Lecturer/Lecturer  
Department of Computing Studies

Qualifications for appointment and salaries (C) + HK\$1.25 on 7.12.83. Principal Lecturer: HK\$208,080 HK\$250,320 p.a. Candidates should have (a) good honours degree or professional qualification and an advanced specialist qualification in computing studies; (b) substantial professional experience; and (c) substantial professional experience.

Senior Lecturer: HK\$170,870 HK\$228,360 p.a. Candidates should have (a) good honours degree or professional qualification and an advanced specialist qualification in computing studies; (b) substantial professional experience; and (c) substantial professional experience.

Lecturer: HK\$94,440 HK\$166,110 p.a. Candidates should have (a) a good honours degree or equivalent professional qualification but in certain disciplines, candidates with lower qualifications, such as a Higher Technician level, may be considered; and (b) at least three years' professional experience.

Applicants will be on temporary full-time basis. Suitable appointments may be offered on a part-time basis. The Polytechnic has a long established reputation for excellence in teaching and research. It also has a strong commitment to the advancement of the community.

Further information and application forms are obtainable from the Association of Commonwealth Universities (A.C.U.), 20 Gordon Square, London WC1H 0PF. Completed application forms should be returned by January 31, 1984, with the first copy direct to the Principal Lecturer, Hong Kong Polytechnic, Hung Hom, Kowloon, Hong Kong, and the second copy to the Association of Commonwealth Universities.

## Leicestershire

READVERTISEMENT - Previous applicants need not re-apply.

## MANAGER

NORTH LEICESTERSHIRE INFORMATION TECHNOLOGY CENTRE (LOUGHBOROUGH)

Salary: up to £12,735 p.a.

We are seeking an energetic, imaginative professional with the skills and initiative to develop and manage this exciting new project.

The Centre will open with six staff covering the four departments - hardware, software, application of computers and the electronic office. A comprehensive and practical training programme will be offered to school leavers and involve developing links with local industry for project work and industrial training placements.

Candidates should be qualified to degree level with relevant experience in electronics, information technology or similar. An industrial or commercial background is considered essential.

The right candidate will have the opportunity to influence the style and direction of a venture which must be flexible enough to adapt itself to current and future employment and training needs in a rapidly changing field.

Application form (returnable by 20th January, 1984) and further details obtainable from the Manpower Services Officer, Chief Executive and County Clerk's Department, County Hall, Glenfield, Leicester. Telephone: Leicester 671913, Ext 7433. (7101)

THE UNIVERSITY OF ASTON  
IN BIRMINGHAM  
DEPARTMENT OF MECHANICAL ENGINEERING

## "NEW BLOOD" LECTURESHIP

Applications are invited for a "New Blood" appointment which has been awarded by the UAC to the Department of Mechanical Engineering in recognition of its developing strength. The work is either in the application of microcomputer systems or in the application of identification techniques in the control of Mechanical Systems. The post would be of interest to mechanical or electrical engineers or applied scientists with a developing advanced software for the design and control of machinery. The University is creating an exciting technical environment for its teaching and research work. The Engineering faculty has excellent computing facilities: the Mechanical Engineering has considerable industrial support.

The appointment will be for a period of three years initially, with the possibility of renewal or subsequent transfer to a continuing appointment. Initial salary will be within and up to the maximum of the range £2,180 to £4,225 per annum.

Application forms and further particulars may be obtained from the Staff Officer (quoting Ref: 584/102), University of Aston in Birmingham, Gosta Green, Birmingham B4 7ET. Tel: 021-359 5611 Ext 4994. Closing date for the receipt of applications is 31st January 1984. (7037)

THE UNIVERSITY OF SUSSEX  
RESEARCH FELLOW  
IN  
SPEECH PROCESSING

Applications are invited for a post-doctoral research fellow to work on an SERC-funded project investigating methods for processing phonetically useful parameters from speech. The project will apply computational ideas from visual scene analysis to auditory information processing, and also to investigate experimentally early stages in the auditory analysis of speech.

Applicants should have research experience in digital signal processing, speech processing, hearing or speech. The project will use the laboratory's VAX-11/780 computer. The appointment will be for up to three years from January 1, 1984, or as soon as possible thereafter, and will be initially between £7,100-£7,350 per annum (plus £1,180-£1,510 per annum).

Further information can be obtained from Dr C. J. Darwin, Laboratory of Experimental Psychology, University of Sussex, Falmer, Brighton BN1 9QJ (0273 80928). Ext 641. (7067)

HEREFORD & WORCESTER  
COUNTY COUNCIL  
WORKERS' TECHNICAL COLLEGE  
DEPARTMENT OF SCIENCE  
& MATHEMATICSLecturer  
Grade 1  
Computing

The person appointed must be enthusiastic and be prepared to teach computing to level, the Youth Training Scheme, GCE at General and National levels, Business Studies, and Computer Applications in English, Science and Building.

Salary: Lecturer Grade 1 £5,845-£6,735 (plus on scale dependent on qualifications and experience).

Further details and an application form can be obtained from The Principal, Worcester Technical College, Daneway, Worcester WR1 2AF, upon receipt of a stamped, self-addressed envelope, including s.c. (Please quote reference BM/CW).

(7067)

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BOROUGH OF LANGBAURGH  
Town Clerk's DepartmentCOMPUTER MANAGER  
P.O. (sc. 35 to 39) - £10,242 to £11,364

Langbaugh is a borough with a population of over 150,000, situated on the south bank of the River Tees in Cleveland.

The Computer Manager (a new post) will be responsible for computer policy and development. At present, the borough uses Data General County Council's mainframe computers (IBM 3083 and 3084 systems) but has recently decided to carry out a range of developments locally on a microcomputer system. The post-holder will be responsible for the control and co-ordination of these developments.

Applicants must have relevant experience and knowledge of microframe and minicomputers and must be professionally qualified.

Application forms and further details are obtainable from the Town Clerk, Langbaugh Town Hall, Fabian Road, South End, Middlebrough, Cleveland TS6 9AR. Telephone: 0642 246345, Ext 233. Closing date for receipt of completed application forms is Monday, January 23, 1984.

Males/Females may apply

LONDON BOROUGH OF  
BRENT AND EALING  
JOINT COMPUTER  
INSTALLATION  
NETWORK SUPPORT  
OFFICER

(Based at Acton Town Hall)

£6,991-£7,632pa

The network currently available from 7.30am-8.30pm. These support users with a telephone contact throughout the period of availability.

Primary duties are problem reporting, equipment, network monitoring and equipment installation. Experience in operating data communication equipment is essential.

Please quote reference: 072 FD. Closing date: 20.1.84.

Application forms obtainable from the Personnel Office, Room A/204, Town Hall Annex, New Broadway, Ealing W5 2BY. Telephone 01-846 1895 (24-hour service). (7107)

LEWISHAM & NORTH SOUTHWICK  
HEALTH AUTHORITYMICRO ANALYST/  
PROGRAMMER

Lewisham and North Southwick Health Authority have several computer developments in progress and have applications already submitted for use of computing in the Authority's project to expand rapidly over the next few years.

There is a vacancy in the District Computer Services Unit for an Analyst/Programmer to work on microcomputer data bases and management reporting systems. Applicants should have experience in diagnostic and other support systems. The successful candidate will be responsible for the development of micro CPM and database software, together with other micro operating system and micro networks would also be an advantage.

Salary £7,404 p.a. - £8,025 p.a. - £10,040 London Weighting.

For further details please contact the Personnel Officer, Guy's Hospital, London S.E.1. Telephone 01-407 7800, ext. 30. Please quote ref: A/10. (6998)

SKELMERDALE INFORMATION TECHNOLOGY CENTRE  
SENIOR SUPERVISOR  
(up to £9,660 p.a.)  
SUPERVISORS (6)  
(up to £8,712 p.a.)

The Skelmerdale TEC, which is being sponsored by Lancashire Enterprises Limited and West Lancashire District Council, is now seeking staff to support the Manager in the changing new project.

The Centre will provide 12 months' training and "hands on" work experience for all young unemployed people in the new information technology, thereby enhancing their job prospects. The Centre will cover three main areas of training:

i) Microelectronics - modern electronic components and the use of microprocessors as simple control devices.

ii) Microcomputing - skills associated with microcomputer operations, and application of computer architecture, both hard and software, and an elementary high-level programming facility.

iii) The Electronic Office - use of computers and electronic communications systems in modern business applications.

In addition, the Centre will assist the local industrial and commercial community by making the technology available to local firms, especially new and small businesses. The successful candidates will be responsible to the Manager for the development and implementation of training programmes. Applicants must have qualifications and/or experience in one or more of these training areas and must have the ability to communicate their knowledge and experience to the trainees.

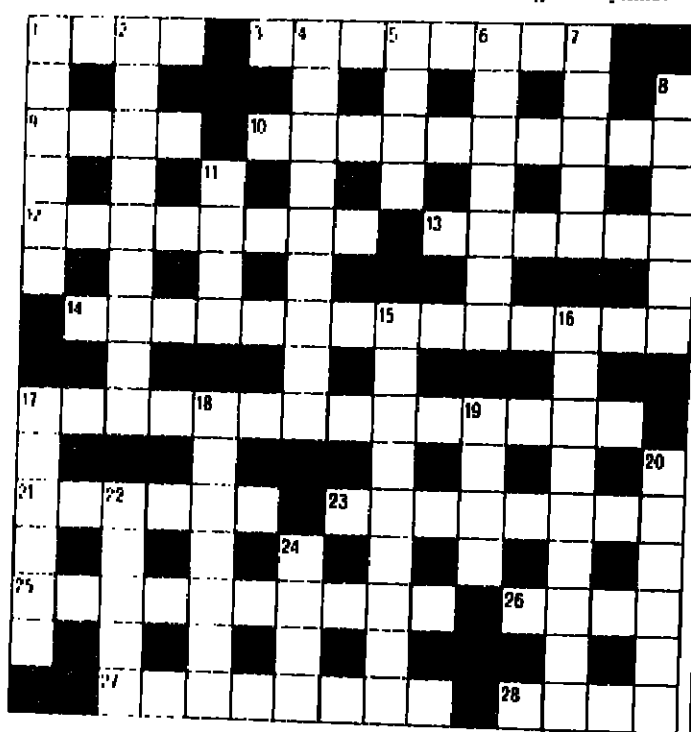
Application form and further details from Personnel Manager West Lancashire District Council 52 Derby Street, Skelmerdale, Yorkshire YO21 2JH. Telephone: (0458) 77177, Extension 337/338. Closing date: January 20, 1984. (7100)



## Prize Crossword No 48

Compiled by Alec Robins

A prize of £10 will be awarded for the first correct entry opened. The second and third solutions opened will receive £5 each. Entries to Crossword Competition, Computer Weekly, Quadrant House, The Quadrant, Sutton, Surrey SM2 5AS, by first post Friday, January 13. Please use a ballpoint pen to complete the crossword, and include a telephone number at which you can be reached during the daytime.



Name ..... (Miss, Mrs, Ms, Mr)

Address .....

Telephone .....

I accept the rules and conditions of the Computer Weekly Crossword Competition.

Signed ..... Date .....

## ACROSS

- 1 A mess, gathered in with a shovel (4)
- 3 Made progress, being ahead of one's time (8)
- 9 A thick slice, or a thin flat piece (4)
- 10 Rope-sled shoe could even make idlers leap (10)
- 12 With everyone sweet around one, an association is formed (8)
- 13 Former PM at present reflecting about the Italian Socialist's leader (6)
- 14 Singing dressings for group a long time in the waves (6-8)
- 17 What's made each January, again, in connection with a clue's answer (1,3,10)
- 21 Go over again in memory about overthrow of wickedness (6)
- 23 Amaze, when turning this on (8)
- 25 Overseer's excellent face protector (10)
- 26 Teller of fairy tales is back in the bar (4)
- 27 Instrument that's pointed at the ship is unnecessary (8)
- 28 Shelf with front cut away is an advantage (4)

## DOWN

- 1 Cavalryman's hospital, one found in Russia (6)
- 2 Kind of firearm for tedious little chap? (5-4)
- 4 Turmoil about languages, history, etc. - they contain lots of rubbish (4-5)
- 6,5 Deprived of self-control and removed on a stretcher? (7,4)
- 7 Possibly Kentish youth brought up in the valleys (5)
- 8 Go badly wrong and then catch up? That's all in the game (6)
- 11 Something delivered in an assembly for dancing (4)
- 15 References leading indirectly to Saul's lion (9)
- 16 Exalted idol, going wild with grief (9)
- 17 Stop for a breather, by the sound of it (6)
- 18 Abstracted mental state evident in clergyman on lake (7)
- 19,20 Assumed command to sanction the accusation (4,6)
- 22 Plant that's in a high place, among the heather, mostly (5)
- 24 Start to phone one involved in cover up (4)

## RULES AND CONDITIONS

1. Each competitor may submit no more than one entry.
2. The competition is open to all readers of Computer Weekly with the exception of the staff of Quadrant Press International Ltd, any printers employed by them or the relatives of any such staff.
3. The solution of each puzzle will normally be published in the issue three weeks after the puzzle has been published.
4. Winners will receive their prizes during the month following the competition.
5. The decision of the editor on the interpretation of the rules and conditions and on all matters shall be final. No correspondence will be entered into.

## GRADUATE PROGRAMMERS &amp; S/W ENGINEERS

Avon/Wilts/Som't/Glos &amp; S. Wales

Superb career opportunities exist for Graduate Programmers and Software Engineers throughout the West Country in both Technical and Commercial environments.

Utilise and fully develop your skills in the following areas:-

- \* Telecommunications - PBX systems
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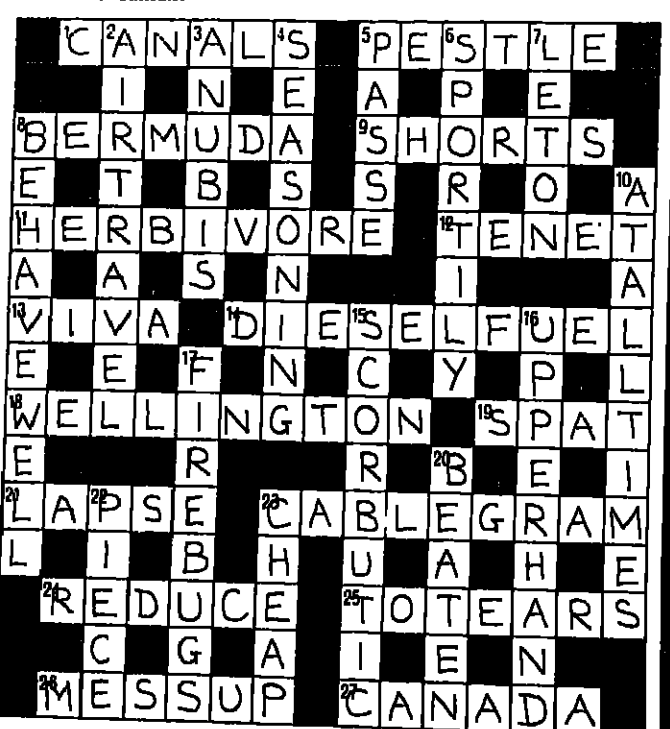
LET US SHOW YOU THE WAY

(111)

AB Executive (Bristol) Ltd.  
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## Solution to Prize Crossword No 47

The first prize of £10 for last month's crossword goes to Liz Twiss, recruitment manager at CAP in High Holborn, London. Prizes of £5 each are on their way to John Bevis, a buyer at Ficionen in Sandbach, Cheshire, and Norman Law, programmer at Marshalls Halifax in Halifax.

BUTEL  
BUSINESS SYSTEMS

Butel Business Systems is a medium-sized Software/Systems House, on target for a £2 million turnover this year. Since our establishment in 1978 we have achieved considerable success in the sale and implementation of turnkey projects and in package development. Now, continuing progress presents a number of excellent career opportunities for true computer professionals.

## Sales Consultants

Target earnings: circa £23,000 + Car + BUPA

We need experienced sales people, or systems people with sales ambitions. You will be selling the full range of Butel products and services, from micro-networks to 32-bit superminis, financial modelling (EPS/FCS) and packaged software. Our suppliers describe us as 'the most sales orientated systems house around', which means you will be encouraged in every way to meet and exceed your targets.

## Systems Consultants/Project Managers

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Experienced System Analyst with proven commercial experience of on line and/or database systems? Experience of project management on at least one significant project? Then there are opportunities for further personal development in an exciting Software House environment, with the latest 32-bit supermini technology, in a wide variety of applications. If you have expertise in DG INFOS/DBMS, HP TOTAL/IMAGE, etc., these vacancies will be of special interest.

## Senior Programmer/Analysts

£9,500-£12,000 + Car + BUPA

Extend yourself and develop your career as a commercial programmer/analyst. You must have proven commercial COBOL experience, preferably in interactive environments. And you must have a willingness and the ability to deal directly with clients.

## COBOL Programmers

£7,500-£9,500 + BUPA

This is an ideal opportunity for young COBOL programmers (minimum 18 months experience) to enter a fast moving commercial environment. Excellent career development opportunities and the latest software technology.

IMPORTANT - All of the positions advertised will be located West of London. In the first instance write with CV, or telephone, the London Office below.

Sales Vacancies: Andy Miller, Sales Director.  
Technical Vacancies: Roy Sparrow, Systems Director. (6950)

## BUTEL

Technology for business

Butel Business Systems,  
Garrick Industrial Centre, Garrick Road,  
London NW9 6AQ. Tel: 01-202 0206.

## SYSTEM/34 &amp; /36

## ANALYST/PROGRAMMERS

RSB is a specialist micro and mini software house with a high reputation for good quality commercial software on IBM PC, 23, 34 and 36. We have a number of System/34 and /36 contracts under development some of which include networked PC communications. We are looking for self-motivated people who have most of the skills listed below.

- \* Solid background in S/34 and GSD.
- \* Experience of commercial systems.
- \* Minimum of two years' RPG II programming.
- \* Systems Design.
- \* Software house exposure would be an advantage.

We have vacancies for analyst and programmers to work for specific customers as well as in the product development team. Salaries will be in line with experience and the package of benefits could include a company car. Interested?

Please call Glyn Davies or Eric Dickinson for an interview (01) 843 1922

RSB COMPUTERS LIMITED  
Wheatfield House, 129-135 Fulwell Road  
Teddington, Middlesex

## MUMPS ANALYST/PROGRAMMERS

HOLLAND

We have a project involving the migration of PDP MUMPS Systems to VAX MUMPS and need experienced professionals with at least ten years' DP experience, six years MUMPS, a knowledge of VAX MUMPS, VMS experience, a knowledge of database methods and experience with dictionary based code generators.

## UNIX AND 'C'

HOLLAND

We have recently started a UNIX division and are seeking specialists in this field. A minimum of three years' programming experience is required with at least one year of C under UNIX. Some practical knowledge of device drivers would be an advantage.

## INTERGRAPH SPECIALISTS

VENEZUELA &amp; EUROPE

Requirements include a good knowledge of INTERGRAPH graphics computers plus VAX and PDP systems. The position would be that of Systems Manager but would require experience on a programmer or user level.

## SCIENTIFIC/TECHNICAL ANALYST/PROGRAMMERS

UK &amp; EUROPE

Experienced personnel are required for a variety of technical projects. Knowledge of the petroleum industry would be an advantage.

Please write giving full career history to: Jaggins Computer Consultancy B.V., Nossaulaan 15, 2514 JT The Hague, Netherlands.

## Computational Mechanics Centre

## Computational Mechanics Centre

## SOFTWARE ENGINEER c.£8K

Computational Mechanics develops and supports a number of software systems for CAD application. A vacancy exists for an engineer to write and support FORTRAN based computer-aided engineering applications. The successful applicant will be required to have a degree in engineering and experience in FORTRAN programming. A knowledge of Finite/Boundary Elements and graphics would be an advantage.

## SALES ENGINEER OOE £17K + CAR

Computational Mechanics is an independent company which specialises in engineering software. The company has an international reputation gained through its innovative approaches to analysis and CAD. The expanding sales of the company has created the need for a sales engineer.

Previous experience of selling FE systems would be an advantage but applicants with a successful record in sales of technical/engineering systems would also be of interest.

As this is a new position, the OOE of £17,000 have been estimated on current levels of sales. The successful candidate is expected to exceed this figure. Both positions are based at the main offices of the company in the New Forest. The surrounding area provides extensive recreational facilities including beaches and is considered to be one of the country's most desirable areas.

Please reply to:  
Computational Mechanics  
Ashurst Lodge  
Ashurst  
SOUTHAMPTON SO4 2AA  
and enclose c.v.

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COBOL, IBM 4341, CMS DEC VAX, FORTRAN, GRAPHICS exp. COBOL, IBM 30XX, DLI or IMS	Programmer/Analysts	Norfolk
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Contract or permanent, we can offer you the range of positions and applications to broaden your technical expertise and enhance your career advancement into project management and beyond. We can also offer you excellent salaries plus the full range of benefits associated with a successful software house, including the opportunity to work on challenging projects throughout the UK, Europe, Middle East and possibly the USA.

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You will be working in a small Data Administration group that supports development project teams, providing expertise on Data Analysis and Database Design and subsequently performance monitoring and tuning. The main database software is IMS/DB with CICS under MVS. It is intended to acquire an MIS/DSS database product in the near future.

Probably in your mid 20's you will have had 2/3 years experience in either a database support group or in programming with database driven applications. Salary is negotiable according to age and experience and will be accompanied by a generous benefits package which includes Non Contributory Pension, Group BUPA scheme, subsidised restaurant, and after a qualifying period season ticket, loan and mortgage facilities.

Call David Mason Johns TODAY on 01-848 5922  
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Cobden House, Park Lane,  
Richmond, Surrey, TW9 2RA



## Quality of Management - 77

It pays to get  
out and about  
with the troops

FIRST of all, I would like to wish you a happy and successful New Year in all your selling endeavours.

For most salespeople, January 1 marks the beginning of another selling year and once again, the realisation that they are no more than yesterday's heroes, starting out at the same level as the rest of the team.

Last year may have brought financial and material rewards for outstanding achievements, even a plethora of those dreadful plastic plaques for achievement beyond the call of duty, but the selling year has completed another cycle and everyone is back on the same level with everything yet to be achieved.

This is also the time of year when salespeople contact companies like mine in order to review the possibility of changing employment. For most, their motivation will be failure. Pressure from their superiors, or their pocket, or both, will have persuaded them to move on. Of these, most will have failed because they are simply not cut out for the selling profession.

Possibly they have enjoyed some success because they spent some

wide array of practical benefits, it has the advantage of incurring no external costs.

The business of making real life sales calls, then counselling and appraising the outcome is a much more dynamic process than the classroom situation, and much more likely to bring about immediate results.

One is dealing with the salesman in his natural habitat, his territory, his customers, his problems, rather than an artificial situation that has been dreamed up by a sales trainer and may be totally irrelevant.

Of course, there are always plenty of excuses to be found when a sales manager is asked why he never gets out and about with the troops, to involve them in training exercises.

- "I've tried, but it doesn't work."
- "I find it too difficult."
- "I don't have the time."
- "I've more important things to do."
- "There's no need, we only employ experienced salespeople."
- "My salesmen aren't very keen, it puts them off."

One important thing to remember about field training is that it should not be limited to trainees and the less experienced salespeople. Even those successful salesmen who have been with you for many years can still get something out of a day on territory with his boss

time in a seller's market only to fail when it was necessary to sell, rather than simply allowing customers to buy from them.

Sadly, most of these people will obtain selling jobs somewhere simply because the industry is so desperately short of salespeople and most employers have insufficient experience and perception of people to discern the good from the bad, and from the indifferent.

I suppose it is reasonable to say that many of these failed salesmen have had the odds of sales success stacked against them, because they have had little or no selling training. Most of the things they do wrong are because they have never been taught any different.

My company is in the sales training business as well as recruitment, so we are more aware than most that only a small proportion of computer companies get involved in training their people in how to sell.

As a recruitment firm, we deal with well over 200 companies, which include virtually all the major suppliers, and I doubt if more than 10% provide sales training of any kind. What an indictment of the computer industry!

For many, the excuse is that they have no budget for the expenditure. That doesn't say much for their budgeting, their influence upon their superiors or their perception of sales management.

In particular, it makes one wonder if they have ever heard of field training. No, it's nothing to do with farming; it is the invaluable process of accompanying the salesman during his normal selling activity and using each call as a training exercise. In addition to a

■ "Most of my salesmen have been trained too far away."

■ "I don't do it in case it puts sales situations at risk."

■ "I don't have the personal skills to provide effective sales training."

The benefits of field training are not limited to the improvement of selling skills. All right, so there's lots to be gained from a post-mortem, where all the good and bad points are analysed in a constructive manner.

Just as valuable are the many ways in which the relationship between the manager and the salesman can be strengthened. Spending a day together in the field can build up the salesman's confidence in his manager; it will make it clear that he is not working for a desk-bound, self-appointed expert, who knows nothing about the real world.

It will give him satisfaction to know that his boss really understands what is actually happening out on the street and thus their rapport will be strengthened.

One important thing to remember about field training is that it should not be limited to trainees and the less experienced salespeople. Even those successful salesmen who have been with you for many years can still get something out of a day out on territory with his boss.

Some techniques and disciplines can go astray if they are not adjudicated occasionally by an informed observer. Besides which, you don't want to give your best salesman the impression that you are neglecting him.

After all, it's unfair to deprive him of the chance of showing you what an ace salesman he is.

Alan Williams

## PUZZLE ANSWER

THE hidden sequence was 246315. This conclusion may be arrived at as follows:

Designate the five replies A, B, C, D and E. Now, from B eliminate 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100.

eliminate 1 6 2 4 placings in A, thus establishing 5. This action eliminates 5 3 in C, and establishes 6, which in turn eliminates 5 1 in D and thus establishes 2 4. This leaves 246315, since 246315 was ruled out by E.